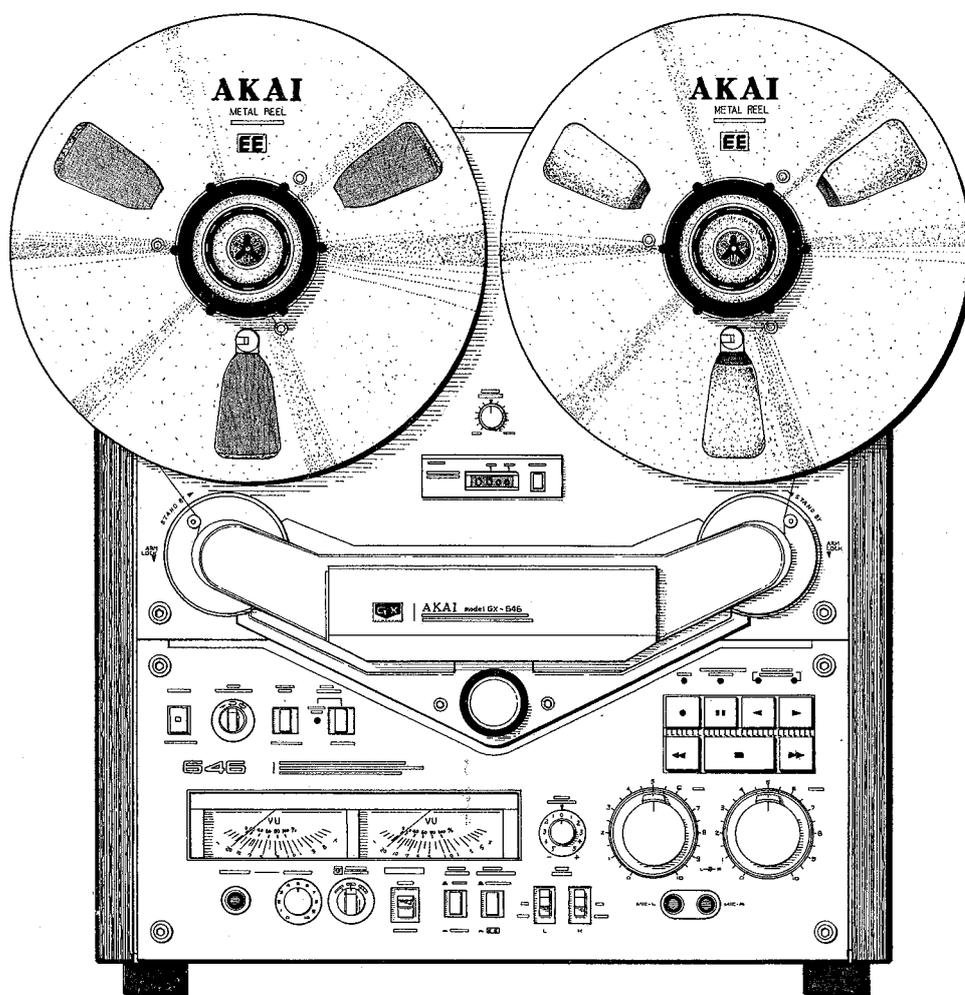


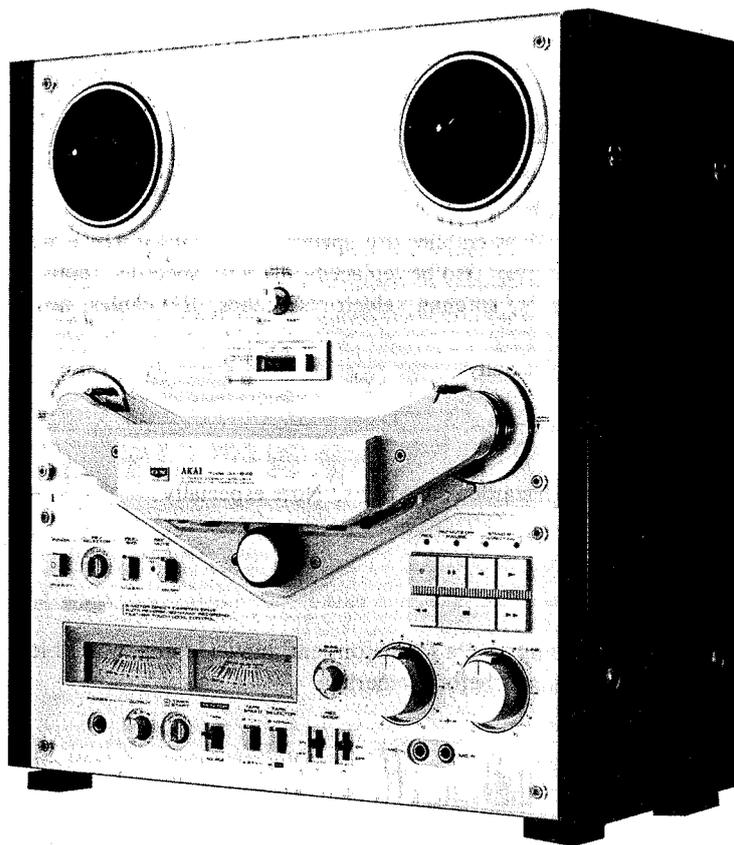
AKAI SERVICE MANUAL

GX-646



STEREO TAPE DECK

MODEL **GX-646**



STEREO TAPE DECK

MODEL GX-646

THIS MANUAL IS ALSO APPLICABLE TO BLACK PANEL MODELS

| | | |
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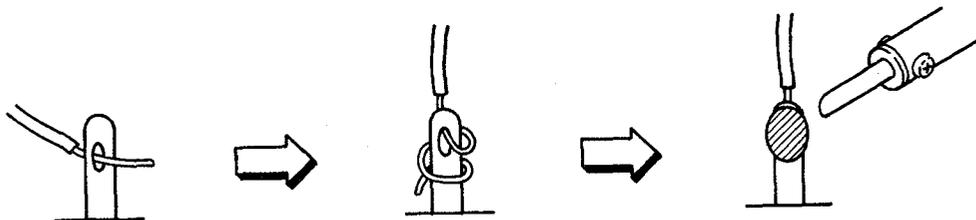
SAFETY INSTRUCTIONS

SAFETY CHECK AFTER SERVICING

Confirm the specified insulation resistance between power cord plug prongs and externally exposed parts of the set is greater than 10 Mohms, but for equipment with external antenna terminals (tuner, receiver, etc.) and is intended for **C** or **A**, specified insulation resistance should be more than 2.2 Mohms (ground terminals, microphone jacks, headphone jacks, line-in-out jacks etc.)

PRECAUTIONS DURING SERVICING

1. Parts identified by the **Δ** symbol parts are critical for safety.
Replace only with parts number specified.
2. In addition to safety, other parts and assemblies are specified for conformance with such regulations as those applying to spurious radiation. These must also be replaced only with specified replacements.
Examples: RF converters, tuner units, antenna selector switches, RF cables, noise blocking capacitors, noise blocking filters, etc.
3. Use specified internal wiring. Note especially:
 - 1) Wires covered with PVC tubing
 - 2) Double insulated wires
 - 3) High voltage leads
4. Use specified insulating materials for hazardous live parts. Note especially:
 - 1) Insulation Tape
 - 2) PVC tubing
 - 3) Spacers (Insulating Barriers)
 - 4) Insulation sheets for transistors
5. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.), wrap ends of wires securely about the terminals before soldering.



6. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.).
7. Check that replaced wires do not contact sharp edged or pointed parts.
8. Also check areas surrounding repaired locations.
9. Use care that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

SECTION 1

SERVICE MANUAL

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For basic adjustments, measuring methods, and operating principles, refer to GENERAL TECHNICAL MANUAL.

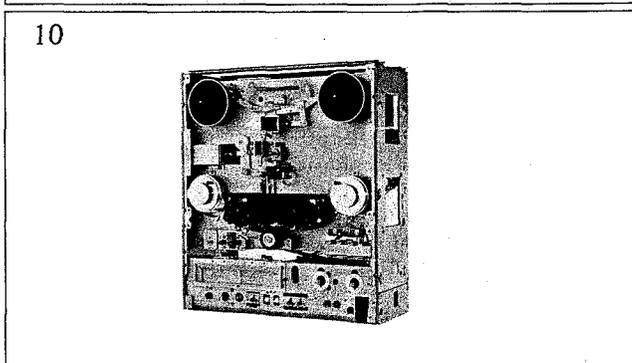
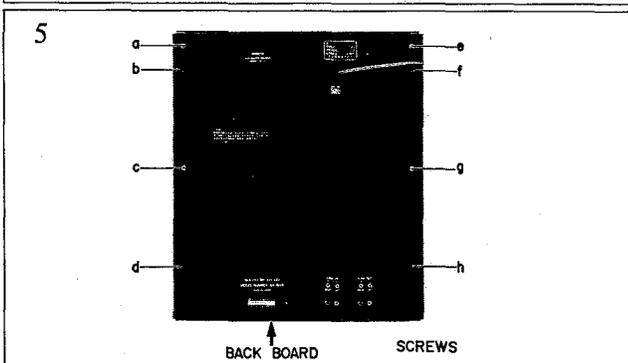
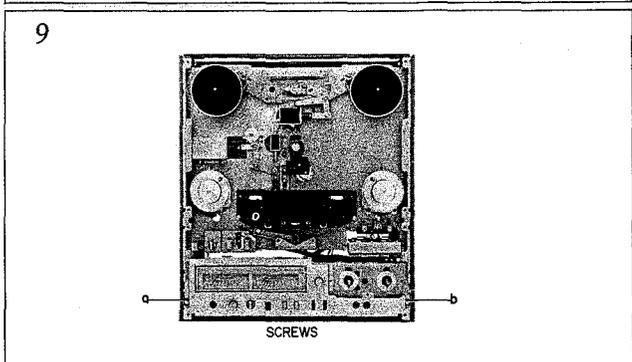
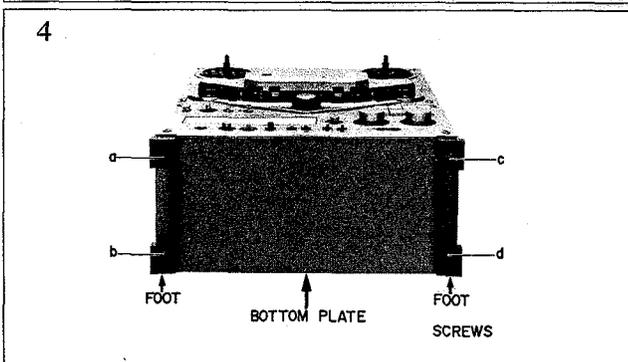
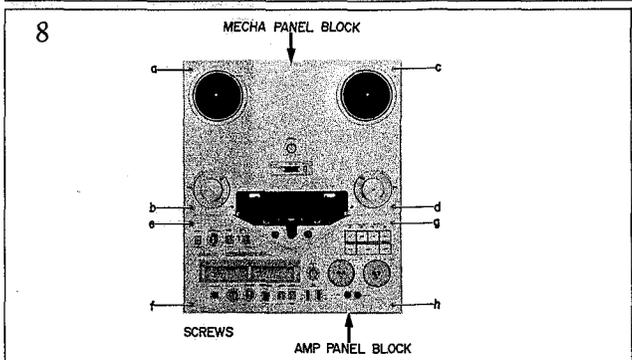
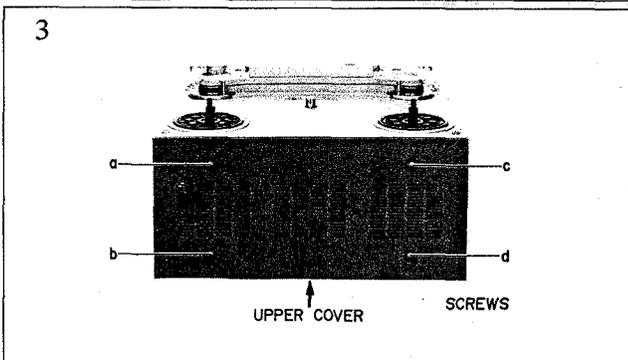
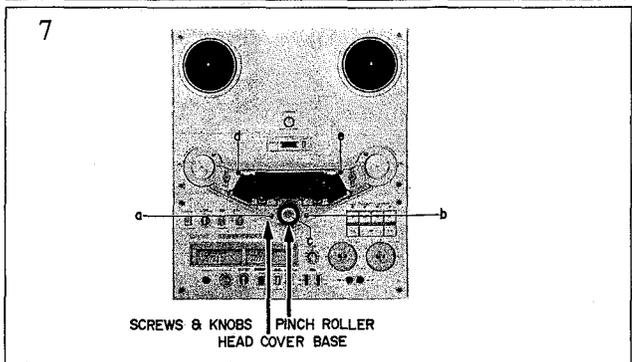
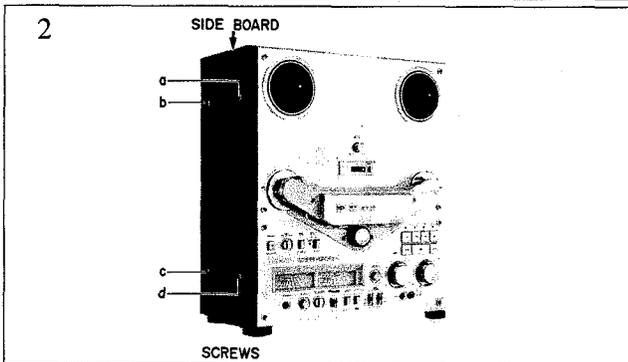
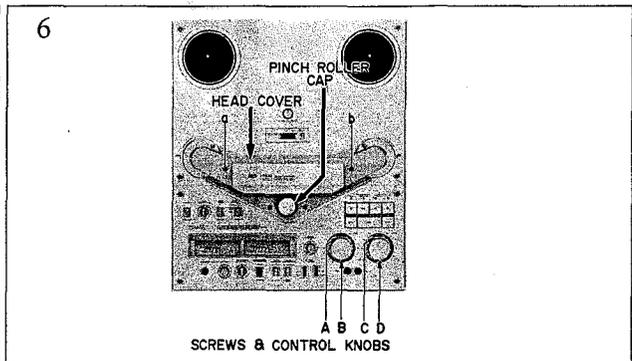
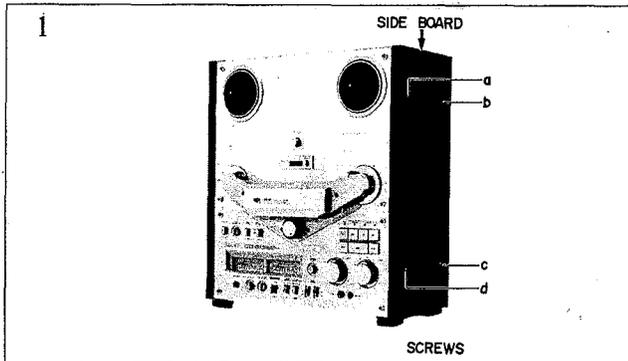
I. SPECIFICATIONS

| | |
|-----------------------|---|
| TRACK SYSTEM | 4 Track 2 Channel Stereo System |
| REEL CAPACITY | Up to 10" reel |
| HEADS | GX head for Recording x 2 GX head for Playback x 2 Erase head x 2 |
| MOTORS | AC Servo motor for capstan drive x 1 AC Eddy current motor for reel drive x 2 |
| TAPE SPEED | 19 cm/s \pm 0.8% (7-1/2 ips.) 9.5 cm/s \pm 1.0% (3-3/4 ips.) |
| WOW & FLUTTER | Less than 0.03% WRMS, 0.07% DIN 45500 at 19 cm/s Less than 0.04% WRMS, 0.09% DIN 45500 at 9.5 cm/s |
| TAPE WINDING TIME | 75 sec. using 360 m (1,200 ft.) Tape |
| FREQUENCY RESPONSE | 25 to 33,000 Hz \pm 3 dB at 19 cm/s 25 to 26,000 Hz \pm 3 dB (0 VU) 25 to 25,000 Hz \pm 3 dB at 9.5 cm/s 25 to 15,000 Hz \pm 3 dB (0 VU) |
| SIGNAL TO NOISE RATIO | Better than 65 dB at 19 cm/s DIN 45500 |
| HARMONIC DISTORTION | Less than 0.4% at 19 cm/s |
| INPUT | MIC: 0.25 mV (input impedance 5.0 kohms) Required microphone impedance: 600 ohms Line: 70 mV (input impedance 100 kohms) |
| OUTPUT | Line: 0.775 V at 0 VU Required load impedance: more than 20 kohms Phone: 100 mV/8 ohms at 0 VU |
| DIN | Input: 2 mV (input impedance 10 kohms) Output: 0.3 V Required load impedance: more than 20 kohms |
| POWER REQUIREMENTS | 100 V, 50/60 Hz for Japan 120 V, 60 Hz for USA & Canada 220 V, 50 Hz for Europe except UK 240 V, 50 Hz for UK & Australia 110 V/120 V/220 V/240 V, 50/60 Hz switchable for the other countries. |
| POWER CONSUMPTION | J 75 W C, A 120 W U 70 W |
| DIMENSIONS | 440 (W) x 483 (H) x 256 (D) mm (17.3 x 19.0 x 10.1 inches) |
| WEIGHT | 21 kg (46.4 lbs) |

* For improvement purposes, specifications and design are subject to change without notice.

II. DISMANTLING OF UNIT

In case of trouble, etc. necessitating dismantling, please dismantle in the order shown in the photographs. Reassemble in reverse order.



III. CONTROLS

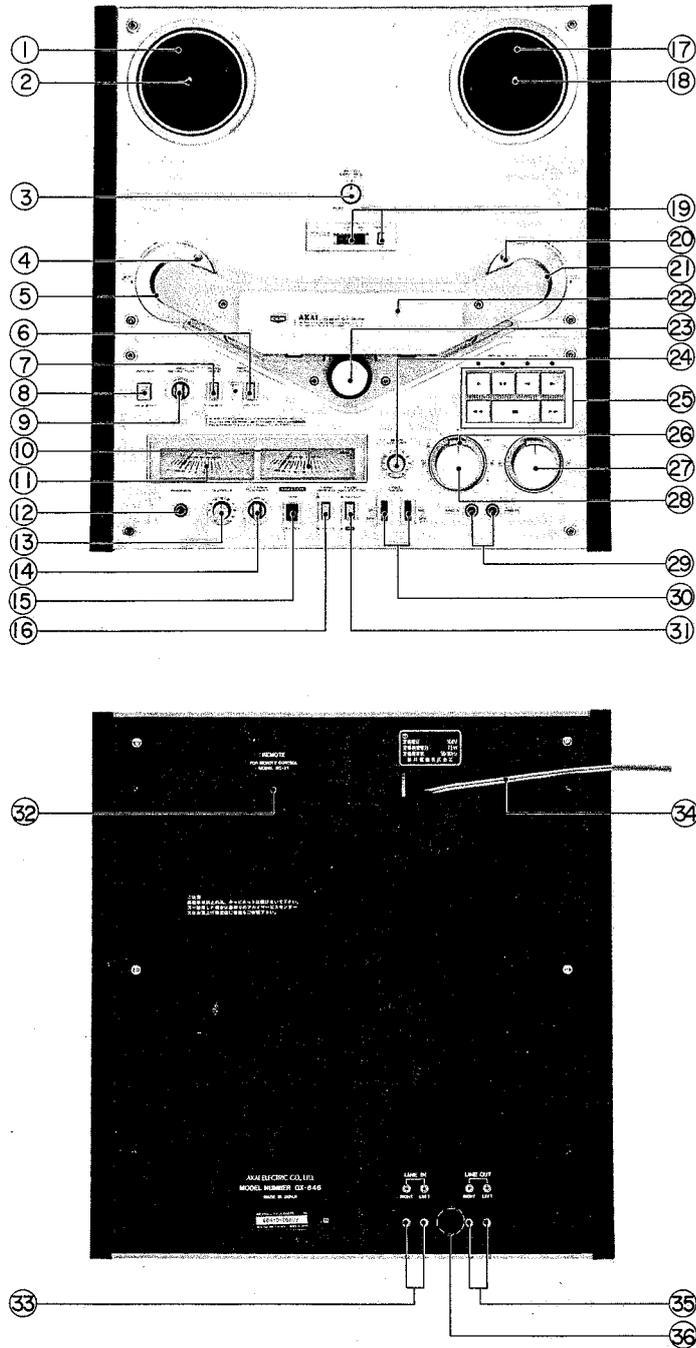


Fig. 1 Controls

- | | |
|------------------------------------|--|
| 1. SUPPLY REEL TABLE | 19. REAL TIME COUNTER and RESET BUTTON |
| 2. BUILT-IN REEL RETAINER (Left) | 20. RIGHT TENSION ARM (SENSING PIN) |
| 3. PITCH CONTROL | 21. GUIDE ROLLER (Right) |
| 4. LEFT TENSION ARM (SENSING PIN) | 22. HEAD COVER |
| 5. GUIDE ROLLER (Left) | 23. PINCH ROLLER |
| 6. RECORDING MUTE SWITCH | 24. BIAS ADJUSTMENT VOLUME |
| 7. REEL SIZE SELECTOR | 25. OPERATING BUTTONS |
| 8. POWER SWITCH | 26. MEMORY MARKER |
| 9. REVERSE SELECTOR | 27. LINE INPUT CONTROLS |
| 10. VU METER (Right) | 28. MICROPHONE INPUT CONTROLS |
| 11. VU METER (Left) | 29. MICROPHONE JACKS (Left/Right) |
| 12. HEADPHONE JACK | 30. RECORDING MODE SWITCH |
| 13. OUTPUT LEVEL CONTROL | 31. TAPE SELECTOR |
| 14. TIMER START | 32. REMOTE CONTROL JACK |
| 15. MONITOR SWITCH | 33. LINE IN JACKS |
| 16. TAPE SPEED SELECTOR | 34. AC CORD |
| 17. TAKE-UP REEL TABLE | 35. LINE OUT JACKS |
| 18. BUILT-IN REEL RETAINER (Right) | 36. DIN JACK (Some models do not have this facility) |

IV. PRINCIPAL PARTS LOCATION

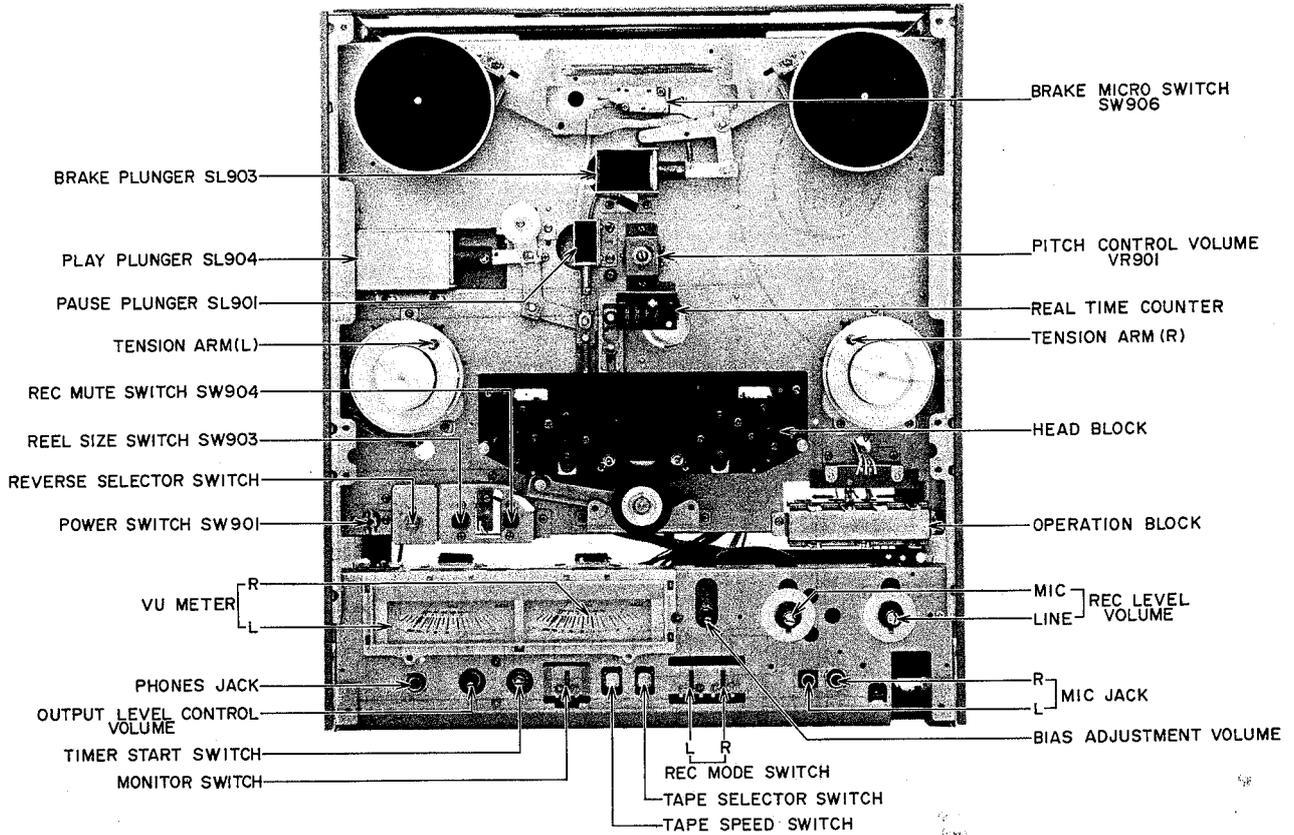


Fig. 2 Front View

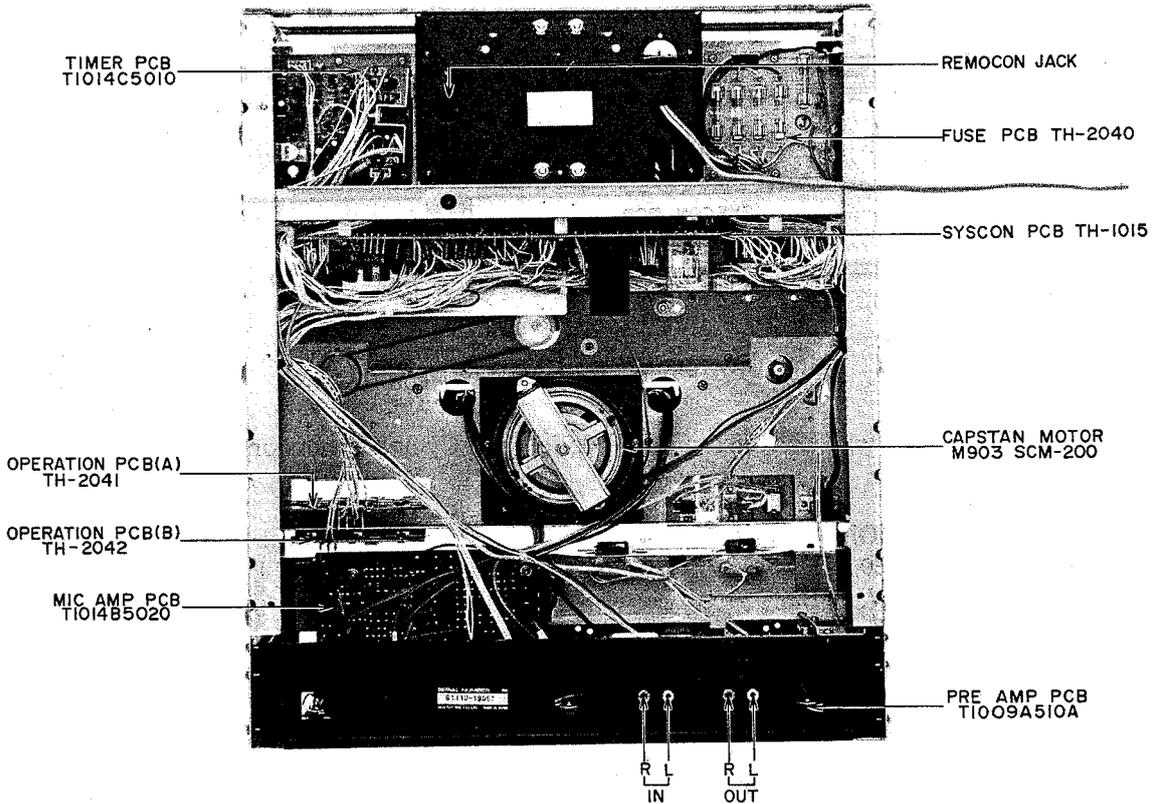


Fig. 3 Rear View

V. VOLTAGE AND CYCLE CONVERSION

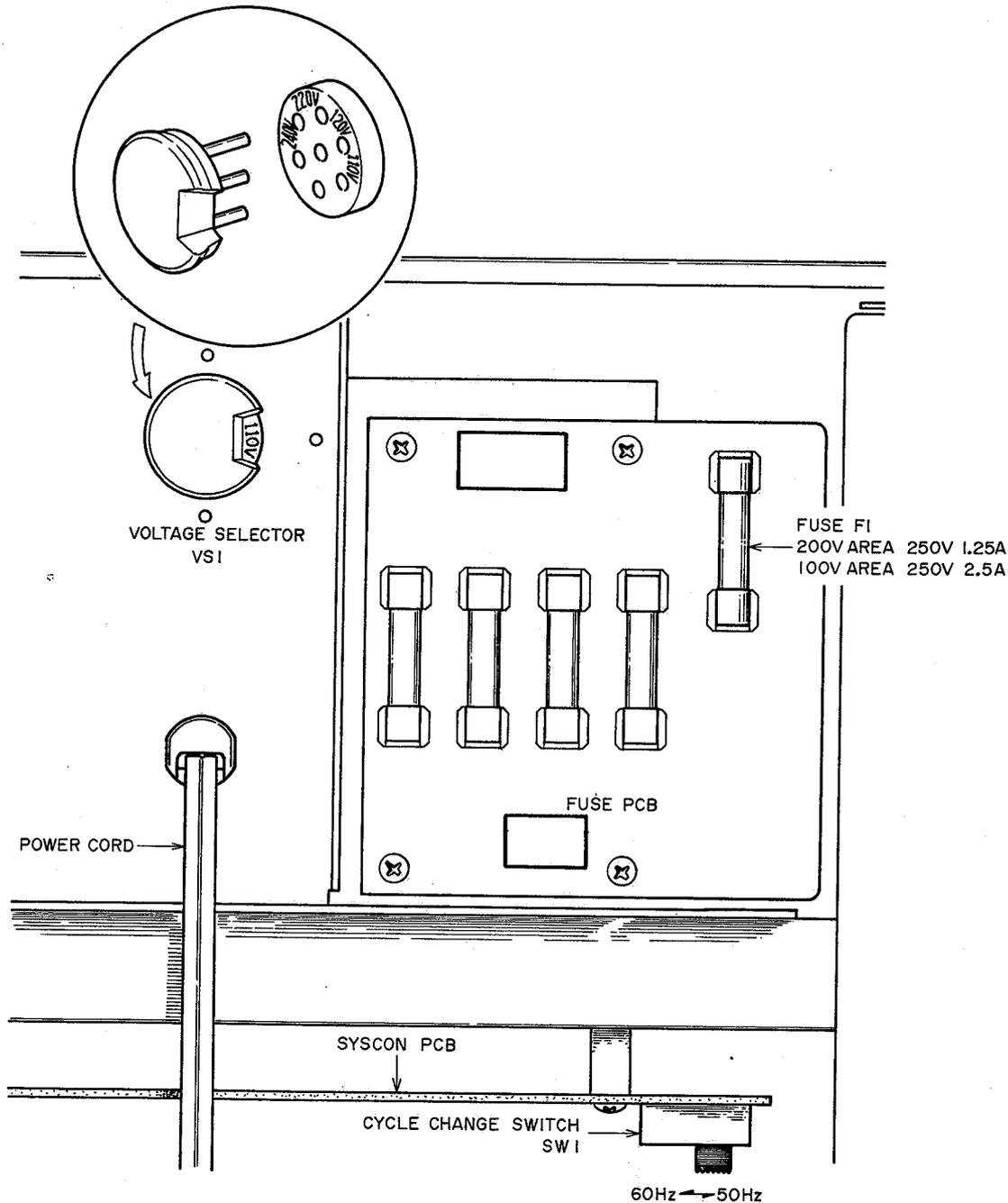


Fig. 4 Voltage Conversion (U/T Model) and Cycle Conversion (U/T, JPN Model)

1. VOLTAGE CONVERSION (Refer to Fig. 4)

- 1) JPN Model (100V, 50/60 Hz)
CSA, AAL Model (120V, 60 Hz)
CEE Model (220V, 50 Hz)
UK, SAA Model (240V, 50 Hz)
Voltage can not be switched.
- 2) U/T Model (110/120/220/240V, 50/60 Hz)
Remove the back board and find out the voltage selector and Fuse P.C Board on the upper portion of the machine. Change the position of voltage selector plugs so that the voltage to be used coincides with the voltage shown through the opening of voltage selector plug.

The rating of fuse (F1) differs depending on the voltage to be used. Change the fuse according to the specified rating shown below.

| | |
|----------------|--------------|
| 110/120 V Area | 250 V 2.5 A |
| 220/240 V Area | 250 V 1.25 A |

2. CYCLE CONVERSION (Refer to Fig. 4)

Cycle can be converted only in U/T, JPN Model. Remove the back board and select the position of switch located in the recess at right portion of Syscon P.C Board to correspond to the frequency of power to be used. Move the switch to the right for 50 Hz and to the left for the 60 Hz.

VI. MECHANISM ADJUSTMENT

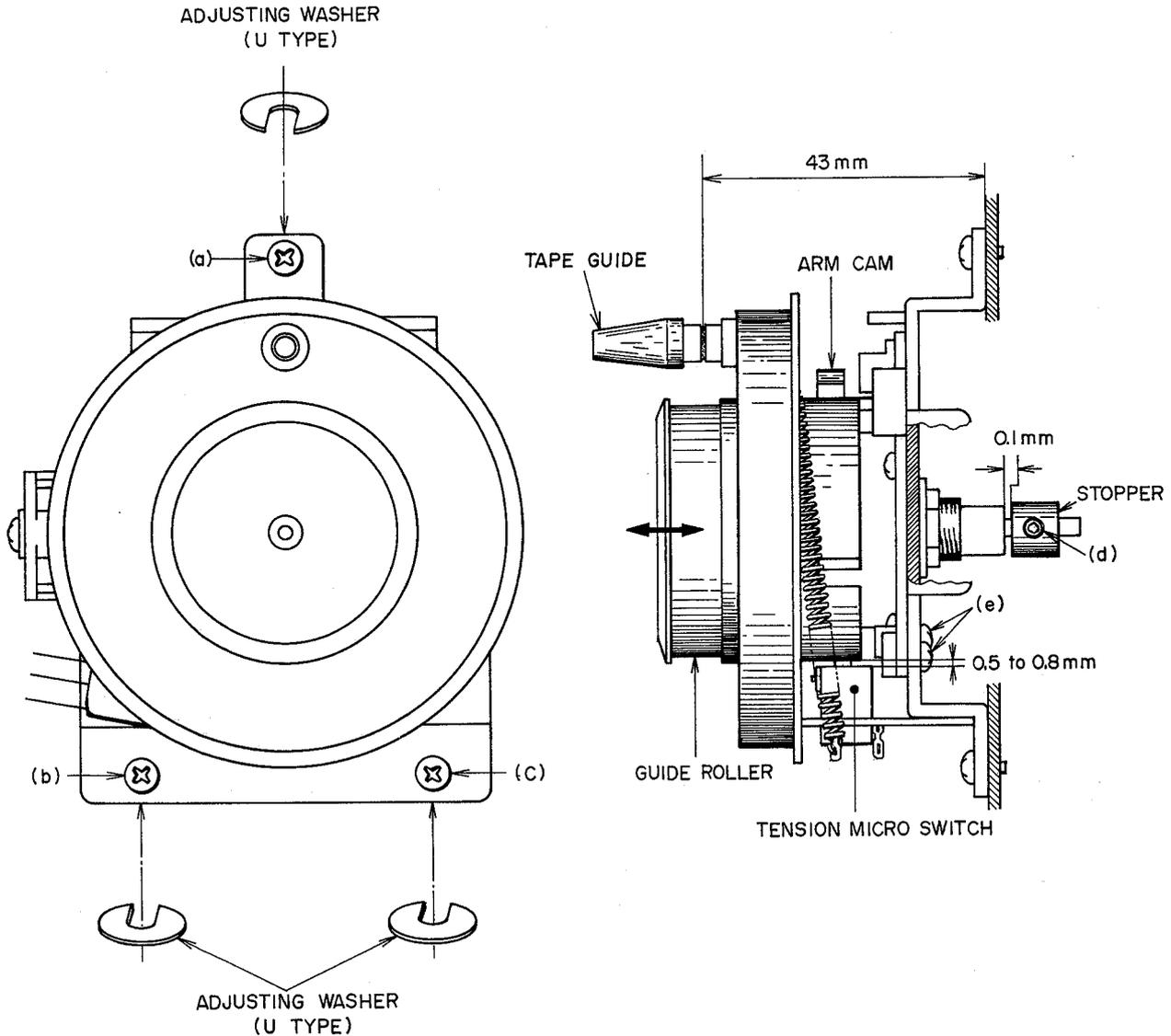


Fig. 5 Roller Block

1. GUIDE ROLLER LOOSE PLAY ADJUSTMENT (Refer to Fig. 5)

Adjust the stopper (roller pulley on the right) screw (d) so that the loose play gap is approximately 0.1 mm when the guide roller is moved as indicated by arrow mark in Fig. 5.

2. TENSION MICRO SWITCH POSITION ADJUSTMENT (Refer to Fig. 5)

Adjust the screws (e) so that the gap between the arm cam and the micro switch is approximately 0.5 to 0.8 mm. Check the the micro switch works and that the arm lock smoothly disengages.

3. ROLLER BLOCK HEIGHT ADJUSTMENT (Refer to Fig. 5)

Use the U type adjusting washers for screws (a), (b), and (c) to adjust the roller block height: the distance between the tape guide center to the chassis board should be 43 mm.

NOTE: Steps 1 and 3 also apply to the right guide roller.

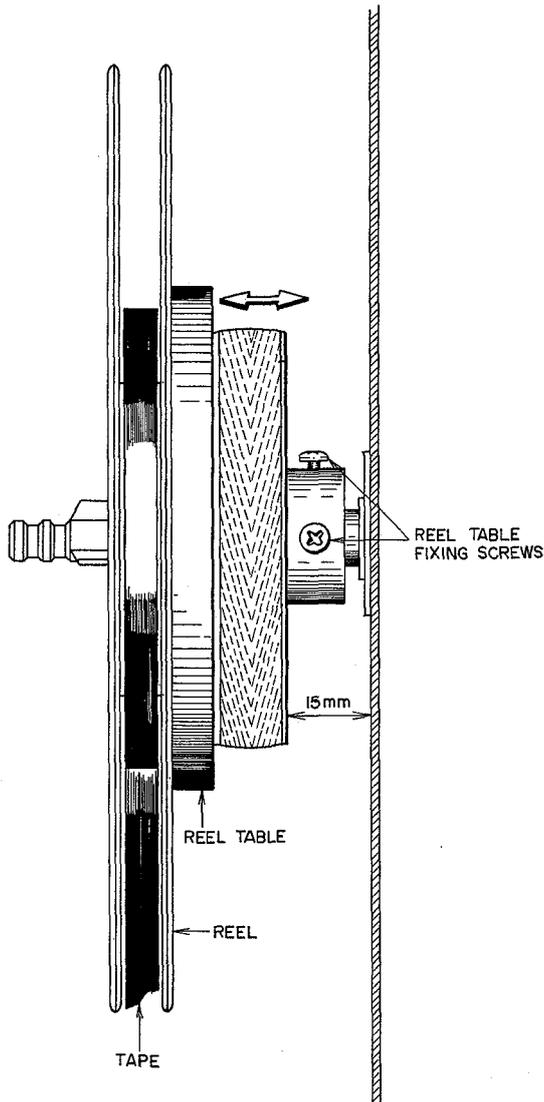


Fig. 6

4. REEL TABLE HEIGHT ADJUSTMENT (Refer to Fig. 6)

- 1) Temporarily screw in the fixing screws leaving a gap of 15 mm between the reel table and the chassis board.
- 2) Run the tape and adjust the height of the reel table so that the tape is taken up in the center of the reel. Tighten fixing screws.
Adjust the height of the right reel table at fast forward, of the left reel table at rewind.

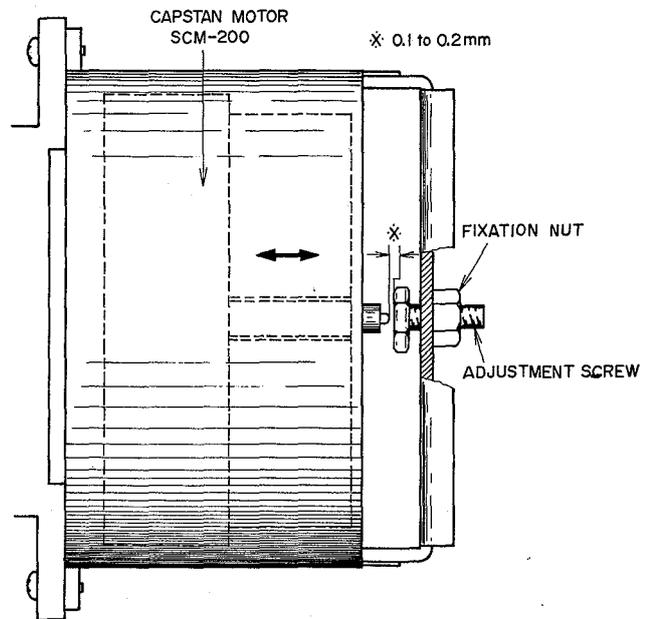


Fig. 7

5. CAPSTAN SHAFT LOOSE PLAY ADJUSTMENT (Refer to Fig. 7)

Adjust by turning Adjustment Screw to obtain a 0.1 to 0.2 mm degree of loose play when the capstan shaft is moved as indicated by the arrow mark. Tighten fixation nut to maintain optimum adjusted condition.

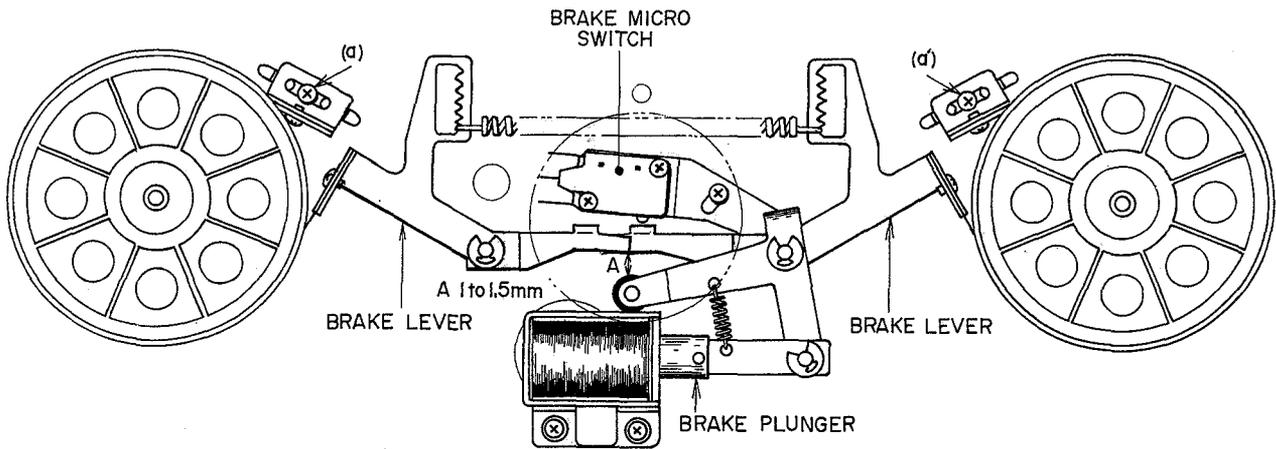


Fig. 8

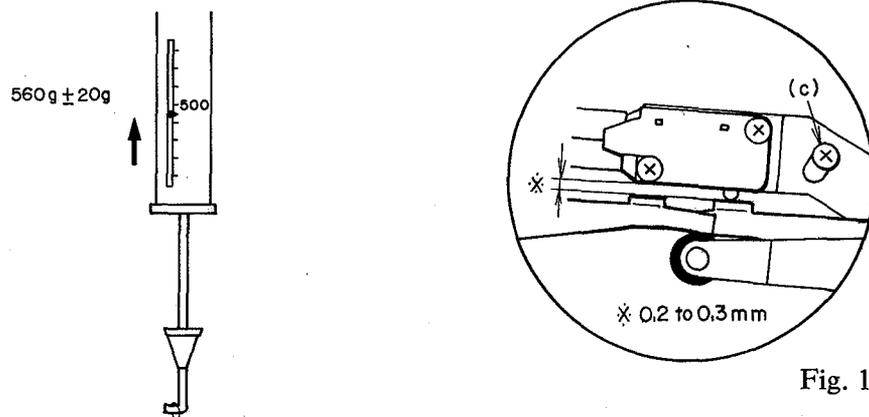


Fig. 10

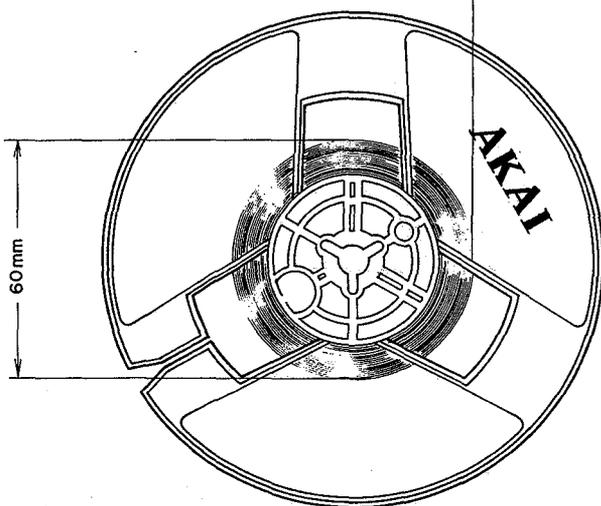


Fig. 9

6. BRAKE BAND POSITION ADJUSTMENT AND BRAKE TENSION ADJUSTMENT (Refer to Figs. 8, 9, 10)

- 1) Adjust the screws (a) and (a') so that the gap A between the brake lever and the rubber is 1 to 1.5 mm.
- 2) Work the brake plunger to check that the brake band is not slanted.
- 3) With the machine stopped, adjust the position of the spring so that a brake tension of 560 ± 20 g is obtained on each brake.
- 4) By working the brake plunger with a finger, adjust the position of the micro switch screw (c) so that the gap between the brake lever and the micro switch body is 0.2 to 0.3 mm.

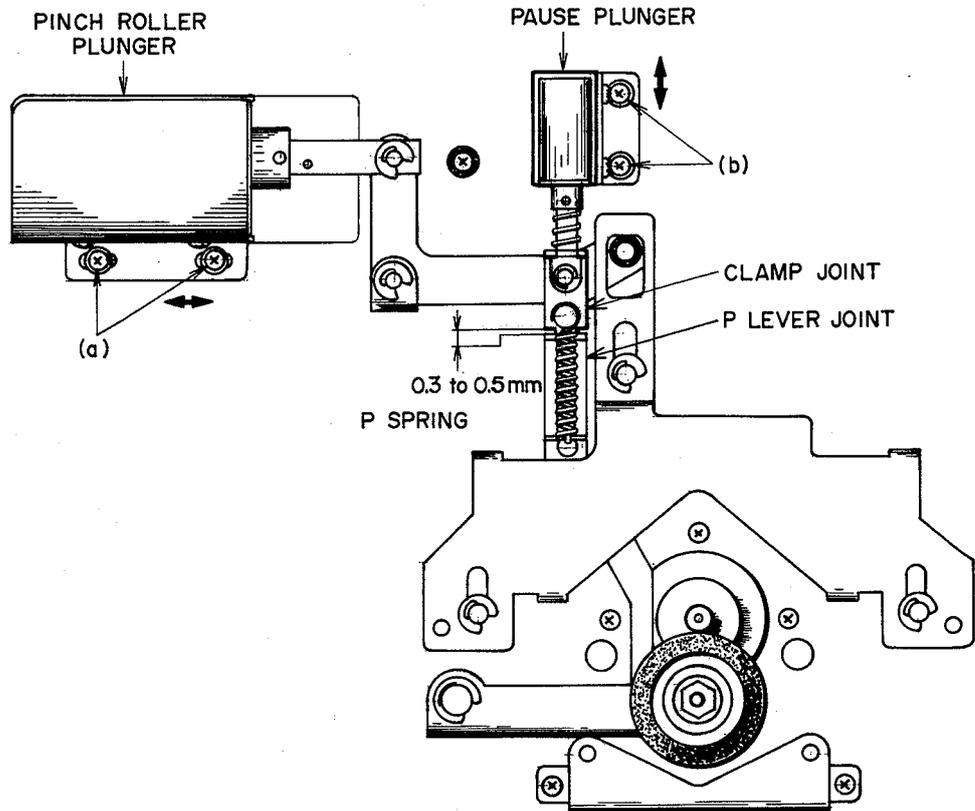


Fig. 11

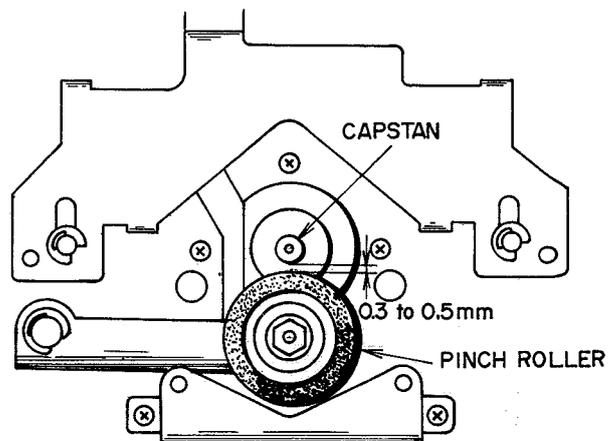


Fig. 12

7. PINCH ROLLER POSITION ADJUSTMENT (Refer to Fig. 11)

At the play mode, the gap between the clamp joint and the P lever joint should be 0.3 to 0.5 mm. Adjust the pinch roller plunger position with screws (a).

8. PAUSE PLUNGER POSITION ADJUSTMENT (Refer to Figs. 11, 12)

At the pause mode, the gap between the capstan and the pinch roller should be 0.3 to 0.5 mm. Adjust the pause plunger position with screws (b).

9. PINCH ROLLER PRESSURE ADJUSTMENT

Connect a 2 kg spring gauge to the pinch roller fixing screws. Pull down the pinch roller and then let it slowly move back. Check that the spring gauge reads 1.2 kg \pm 200 g at the moment the pinch roller touches the capstan and starts rolling.

If it reads otherwise, replace the P spring (See Fig. 12)

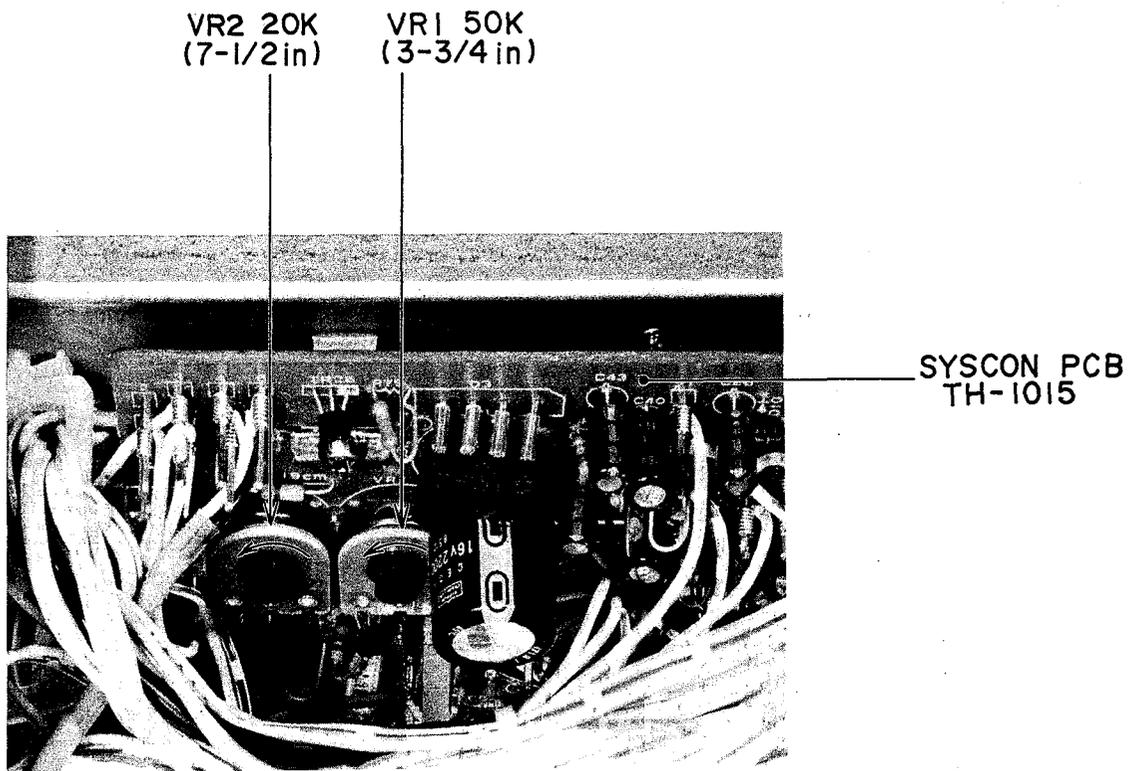


Fig. 13

10. TAPE SPEED ADJUSTMENT

(Refer to Fig. 13)

Set the Tape Speed Switch to 7-1/2 ips. and playback the 1,000 Hz, 7-1/2 Test Tape. Connect a frequency counter to LINE OUT and adjust VR2 20 kB until the counter reads, 1,000 Hz \pm 0.5%. Next, set the Tape Speed Switch to 3-3/4 ips. and adjust VR1 50 kB until the frequency counter reads 500 Hz \pm 0.5%.

VII. HEAD ADJUSTMENT

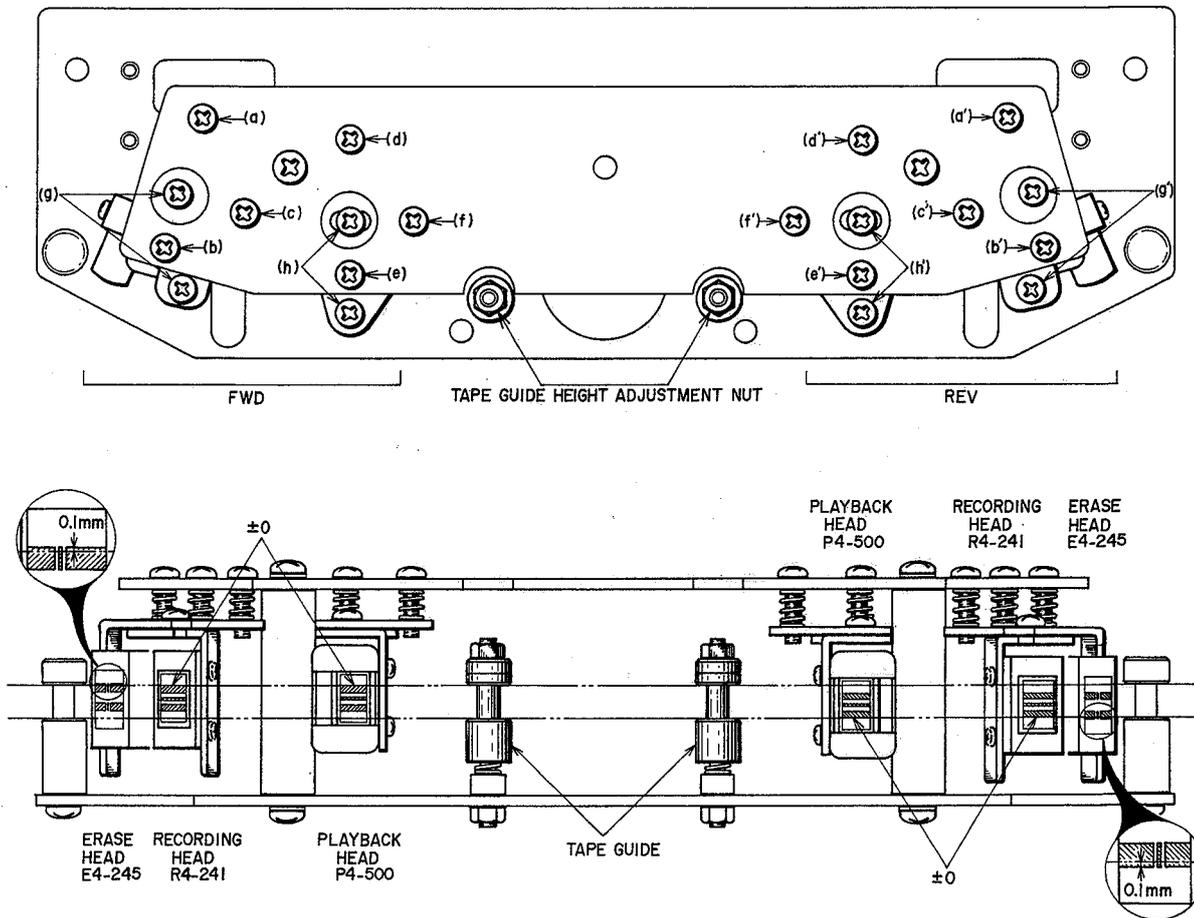


Fig. 14

| STEP | ADJUSTMENT ITEM | TEST TAPE SUPPLY SIGNAL | MODE | ADJUSTMENT POINT | REMARKS |
|------|--------------------------------------|------------------------------------|------|----------------------------------|---|
| 1 | Tape Guide Height | Optional | FWD | Tape Guide Height Adjustment Nut | 1) Adjust so that tape travels smoothly and does not twist. 2) Do not thread tape over tension arm. |
| 2 | FWD Recording Head Height | Optional | FWD | (a) (b) | Upper edges of Left Ch. head core and tape are the same height. |
| 3 | FWD Erase Head Height Confirmation | Optional | FWD | | Upper edge of Left Ch. head core is 0.1 mm higher than upper edge of tape |
| 4 | FWD Playback Head Height | Optional | FWD | (d) (e) | Upper edges of Left Ch. head core and tape are the same height. |
| 5 | FWD Playback Head Azimuth Alignment | 8,000 Hz 3-3/4 ips Test Tape | FWD | (f) | Maximum output, both channels. |
| 6 | FWD Playback Head Angle Alignment | 8,000 Hz 3-3/4 ips Test Tape | FWD | (h) | Adjust head gap surface so that there is no change in output level when tension is applied to the supply reel side. |
| 7 | FWD Recording Head Azimuth Alignment | Maxell UD 15,000 Hz -20 dBm | REC | (c) | Maximum output, both channels. See NOTE 6. |
| 8 | FWD Recording Head Angle Alignment | Maxell UD 15,000 Hz -20 dBm | REC | (g) | Adjust head gap surface so that there is no change in output level when tension is applied to the supply reel side. |

Fig. 15

- NOTES: 1. As perfect head adjustments are vital to tape deck performance, be sure that these adjustments are carried out properly.
2. Be careful not to use a magnetized driver or other magnetized tools in the vicinity of the heads.
3. Use only new tape as level variation is likely to occur when using old tape.
4. Demagnetize heads with head demagnetizer before and after head adjustment.
5. Set tape speed to 7-1/2 ips.
6. Set Tape Selector Switch to NORMAL Position.
7. Adjustments outlined in Fig. 15 are only for FWD side heads. However, adjustments for REV side heads are exactly the same.

VIII. AMPLIFIER ADJUSTMENT

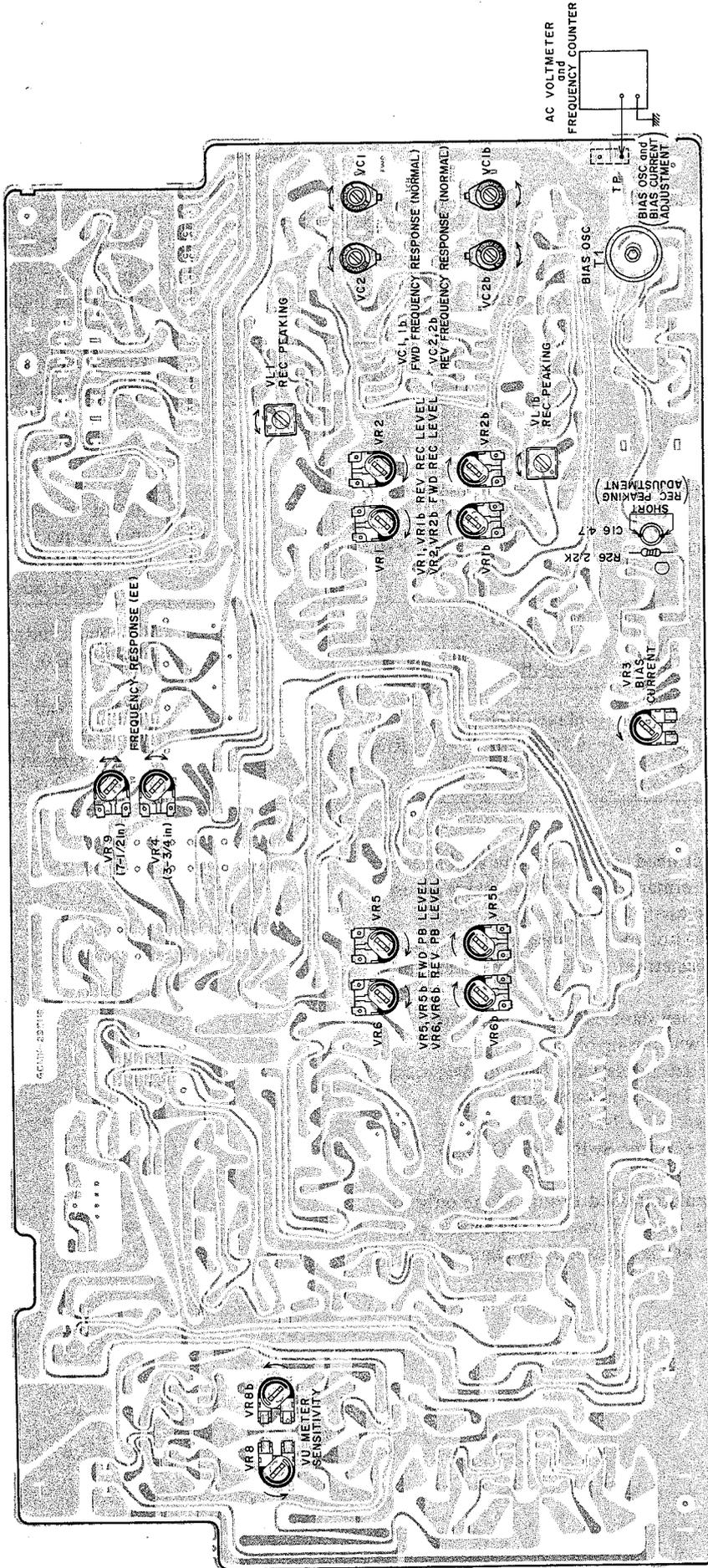


Fig. 16 Pre Amp P.C Board T1009A510A

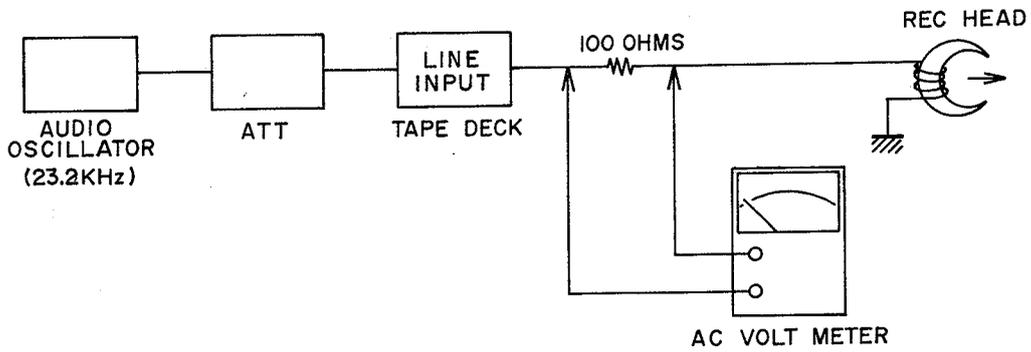


Fig. 17 Rec Peaking Adjustment Instrument Connection

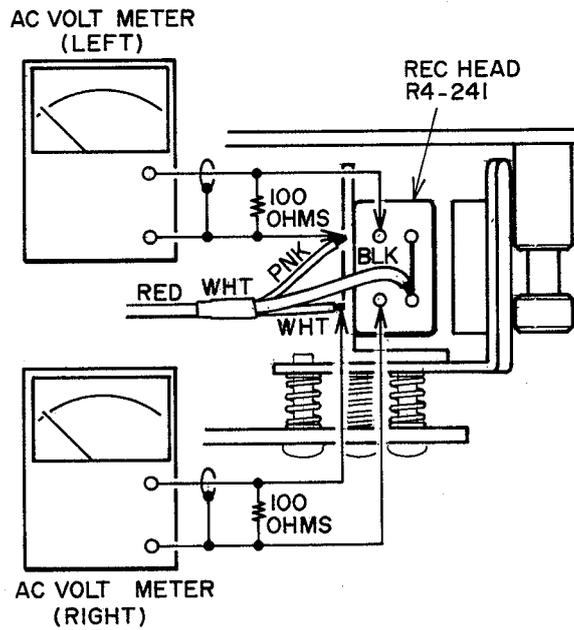


Fig. 18 Rec Peaking Adjustment

| STEP | ADJUSTMENT ITEM | TEST TAPE SUPPLY SIGNAL | MODE | ADJUSTMENT POINT | RESULT | REMARKS |
|------|--------------------|-------------------------------------|------|------------------|---------------------------------------|--|
| 1 | FWD Playback Level | 700 Hz 7-1/2 ips. 0 VU Test Tape | FWD | VR5 50 kB | 0 ± 0.5 dBm (0.775V) | |
| 2 | REV Playback Level | 700 Hz 7-1/2 ips. 0 VU Test Tape | REV | VR6 50 kB | 0 ± 0.5 dBm (0.775V) | |
| 3 | REC Peaking | 23.2 kHz from an Oscillator | REC | VL1 1 mH | Maximum AC Voltmeter indication | Set TAPE SELECTOR to "NORMAL" Tape Speed 3-3/4 ips. See NOTE 6, 7, 9 and Figs. 16, 17, 18. |
| 4 | BIAS OSC | | REC | T1 | 100 ± 0.5 kHz | Set TAPE SELECTOR to "NORMAL" Tape Speed 7-1/2 ips. Connect a Frequency Counter between TP and GND. Fig. 16. |

| STEP | ADJUSTMENT ITEM | TEST TAPE SUPPLY SIGNAL | MODE | ADJUSTMENT POINT | RESULT | REMARKS |
|------|--|---|--------------|------------------|--|--|
| 5 | BIAS Current | | REC | VR3 20 kB | 135.6 ± 0.5 mV | Set TAPE SELECTOR to "NORMAL" Tape Speed 7-1/2 ips. Connect a AC Voltmeter between TP and GND Fig. 16. |
| 6 | FWD Recording Level | NORMAL Blank Tape 1,000 Hz 0 dBm Recording | FWD/REC | VR2 20 kB | 0 ± 0.5 dBm (0.775 V) | |
| 7 | REV Recording Level | NORMAL Blank Tape 1,000 Hz 0 dBm Recording | REV/REC | VR1 20 kB | 0 ± 0.5 dBm (0.775 V) | |
| 8 | NORMAL Position FWD Frequency Response | NORMAL Blank Tape 1.5 kHz, 15 kHz -20 dBm Recording | FWD/REC | VC1 | 1.5 kHz, 15 kHz flat | Tape Speed 3-3/4 ips. Recheck Recording Level. |
| 9 | NORMAL Position REV Frequency Response | NORMAL Blank Tape 1.5 kHz, 15 kHz -20 dBm Recording | REV/REC | VC2 | 1.5 kHz, 15 kHz flat | Tape Speed 3-3/4 ips. Recheck Recording Level. |
| 10 | EE Position Frequency Response (3-3/4 ips) | EE Blank Tape 1.5 kHz, 20 kHz -20 dBm recording | FWD, REV/REC | VR4 10 kB | 1.5 kHz, 20 kHz flat | Tape Speed 3-3/4 ips. Recheck Recording Level. |
| 11 | EE Position Frequency Response (7-1/2 ips) | EE Blank Tape 1.5 kHz, 25 kHz -20 dBm Recording | FWD, REV/REC | VR9 30 kB | 1.5 kHz, 25 kHz flat | Tape Speed 7-1/2 ips. Recheck Recording Level. |
| 12 | FWD Distortion Confirmation | 1,000 Hz 0 dBm Recording | FWD/REC | | NORMAL: Less than 0.5% EE : Less than 0.4% See NOTE 8. | |
| 13 | REV Distortion Confirmation | 1,000 Hz 0 dBm Recording | REV/REC | | NORMAL: Less than 0.5% EE : Less than 0.4% See NOTE 8. | |
| 14 | VU Meter Sensitivity (JPN) | 1,000 Hz 0 dBm from an Oscillator | STOP | VR8 1 kB | 0 VU indication | Set MONITOR Switch to "SOURCE" |

NOTES: 1. Output Level Control should be at maximum.
2. Except for Steps 3, 8, 9 and 10, set Tape Speed to 7-1/2 ips.
3. Except for Steps 10 to 12 and 13, set Tape Selector Switch to NORMAL Position.
4. Set Bias Adjustment Volume to center position.
5. Use the following open measuring tapes:
NORMAL Tape: Maxell UD
EE Tape : Maxell XLII
TDK SA

6. Stop Recording bias oscillator while making Rec Peaking adjustment (Refer to Fig. 16).
7. When 23.2 kHz indicates the peak, check and ensure that the AC Voltmeter show 16 dB of increase when 15 kHz of input is fed rather than when 1 kHz is fed.
8. If it does not comply with the specifications repeat Steps 6 to 10 and 11, and re-adjust.
9. Unless the core is moved intentionally this adjustment is not necessary.

IX. DC RESISTANCE OF VARIOUS COILS

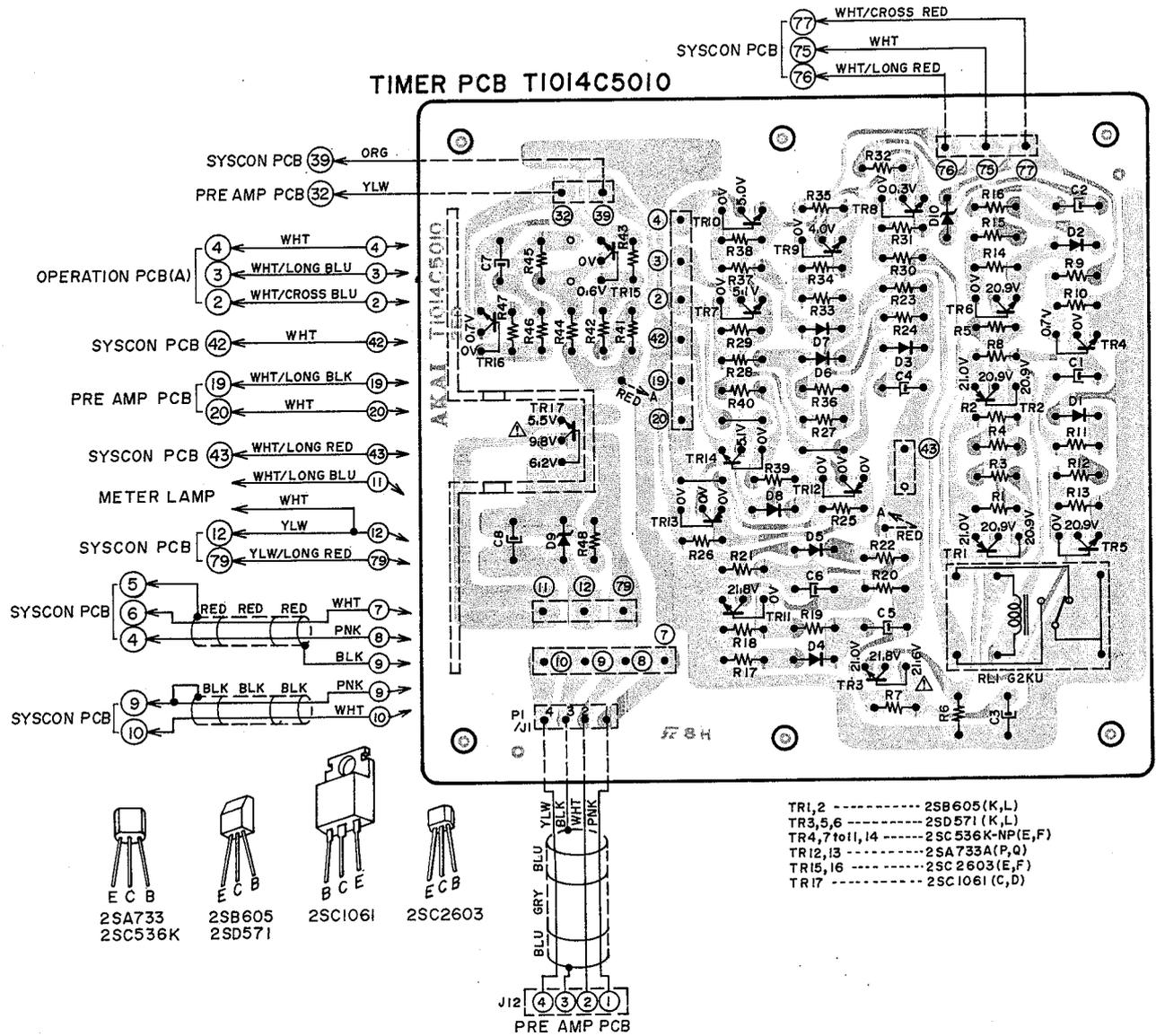
| PART | DESIGNATION | DC RESISTANCE |
|----------------------|---------------|--|
| Main Motor | SCM-200 | Between BLU-RED: 110 ohms Between YLW-BRN: 170 ohms Pick-up Coil: 665 ohms |
| Reel Motor | 24X0-TD | Between BLU-RED: 30 ohms Between YLW-BRN: 157 ohms |
| Pinch Roller Plunger | 1664PLT1 | 600 ohms \pm 10% |
| Brake Plunger | 1240PLT1 | 600 ohms \pm 10% |
| REV Plunger | | |
| Pause Plunger | 0730FLT2 | 600 ohms \pm 10% |
| Relay | MY4-02-US-L | 650 ohms \pm 15% |
| Relay | FBR211BD024-M | 1,280 ohms \pm 10% |
| Relay | G2KU | 1,000 ohms \pm 10% |
| Relay | LAB2NS | 1,750 ohms \pm 10% |
| Erase Head | E4-245 | 3.1 ohms |
| Recording Head | R4-241 | 5.9 ohms |
| Playback Head | P4-500 | 407 ohms \pm 5% |

X. CLASSIFICATION OF VARIOUS P.C BOARDS

1. P.C BOARD TITLES AND IDENTIFICATION NUMBERS

| P.C BOARD TITLE | P.C BOARD NUMBER |
|---------------------------|------------------|
| Pre Amp P.C Board | T1009A510A |
| VU Meter P.C Board | T1009A510B, C |
| Equalizer P.C Board | T1009D530A |
| Bias Adjustment P.C Board | T1009D530B |
| Remocon P.C Board | T1009D2420 |
| Timer P.C Board | T1014C5010 |
| Mic Amp P.C Board | T1014B5020 |
| Syscon P.C Board | TH-1015 |
| Fuse P.C Board | TH-2040 |
| Operation P.C Board (A) | TH-2041 |
| Operation P.C Board (B) | TH-2042 |
| Direction P.C Board | TH-2043 |
| Reverse P.C Board | TH-2044 |
| Sensing P.C Board | TH-2045 |
| Rec Mute P.C Board | TH-2046 |
| Terminal P.C Board | NE-2230 |

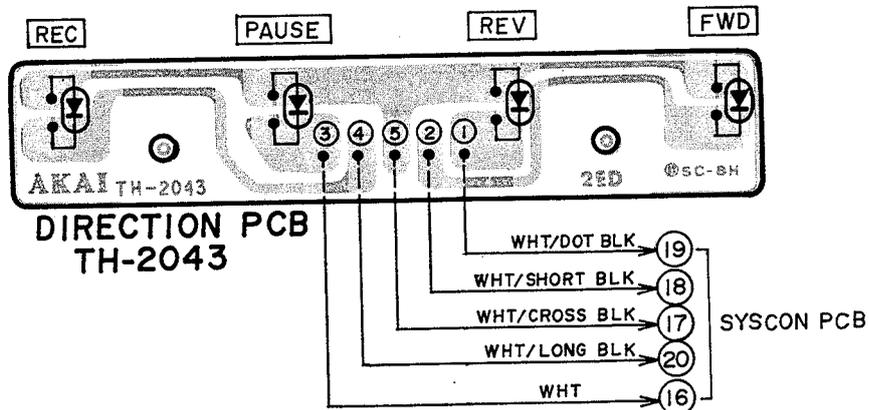
4) Timer P.C Board T1014C5010



WARNING: Δ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.

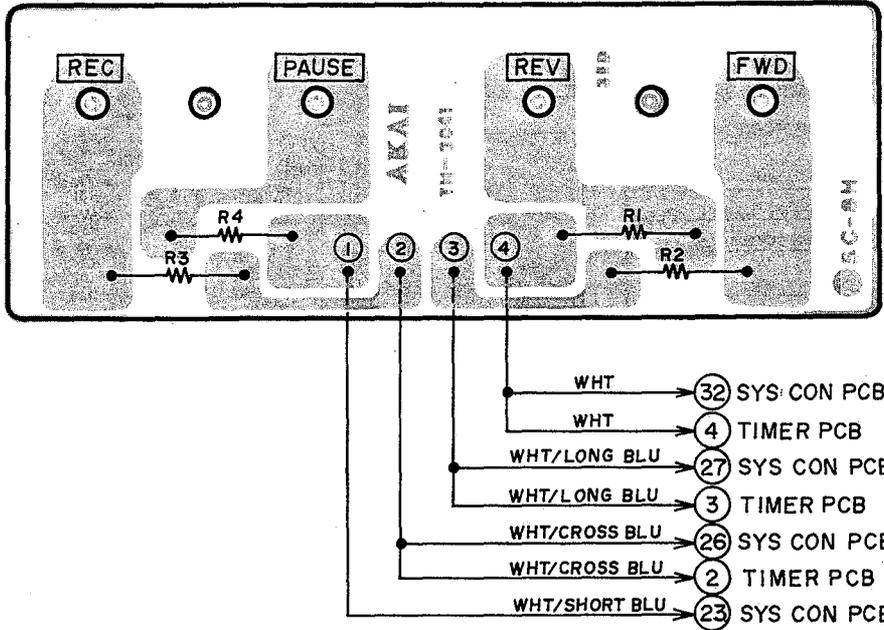
AVERTISSEMENT: Δ IL INDIQUE LES COMPOSANTS CRITIQUES DE SÛRETÉ. POUR MAINTENIR LE DEGRÉ DE SÛRETÉ DE L'APPAREIL NE REMPLACER LES COMPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SÛRETÉ QUE PAR DES PIÈCES RECOMMANDÉES PAR LE FABRICANT.

5) Direction P.C Board TH-2043 (2ED)

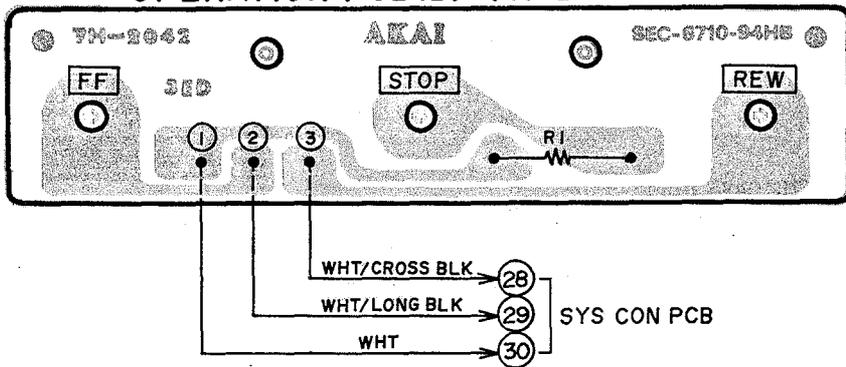


6) Operation P.C Board (A) TH-2041 (3ED) and Operation P.C Board (B) TH-2042 (3ED)

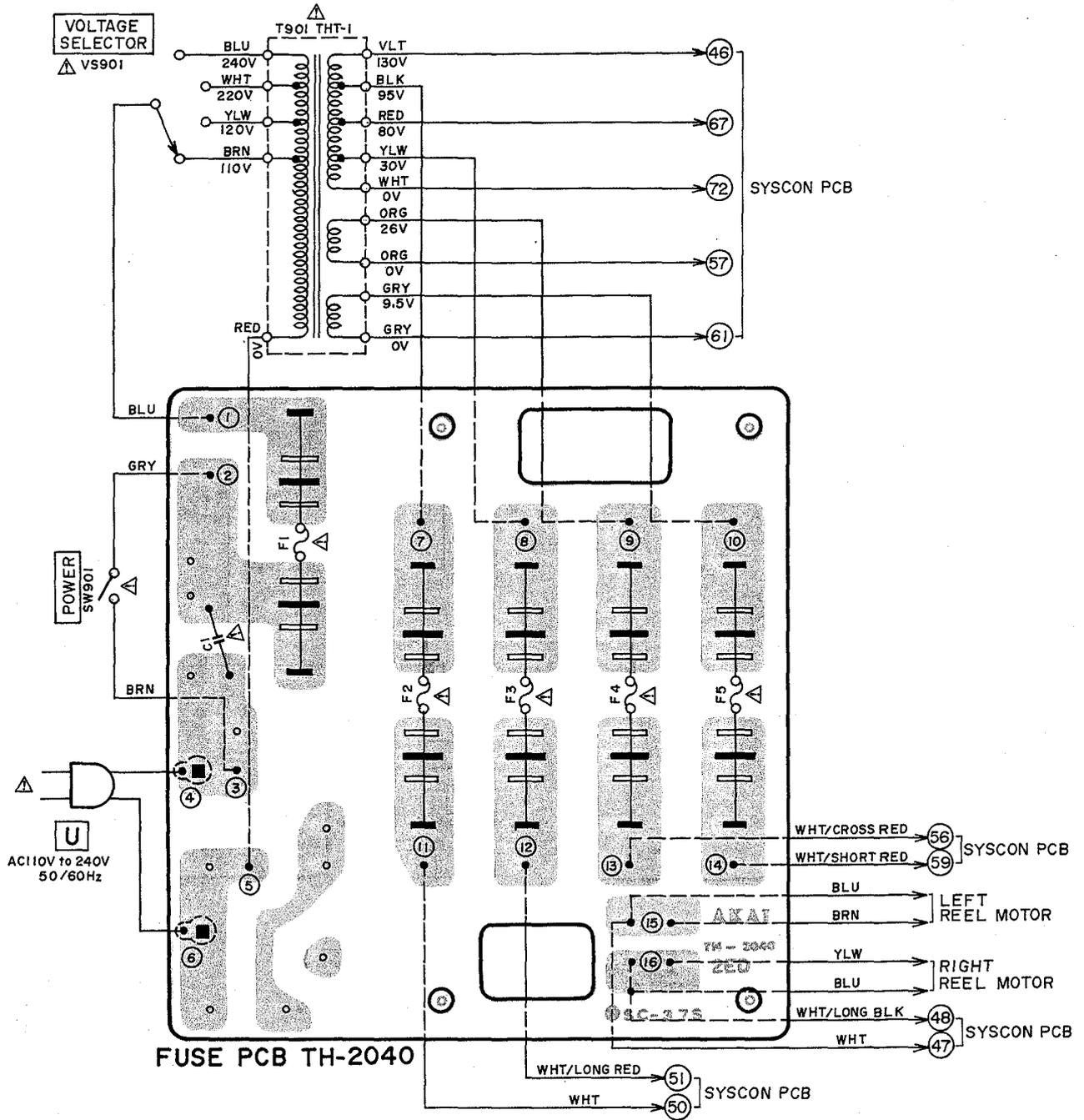
OPERATION PCB(A) TH-2041



OPERATION PCB(B) TH-2042

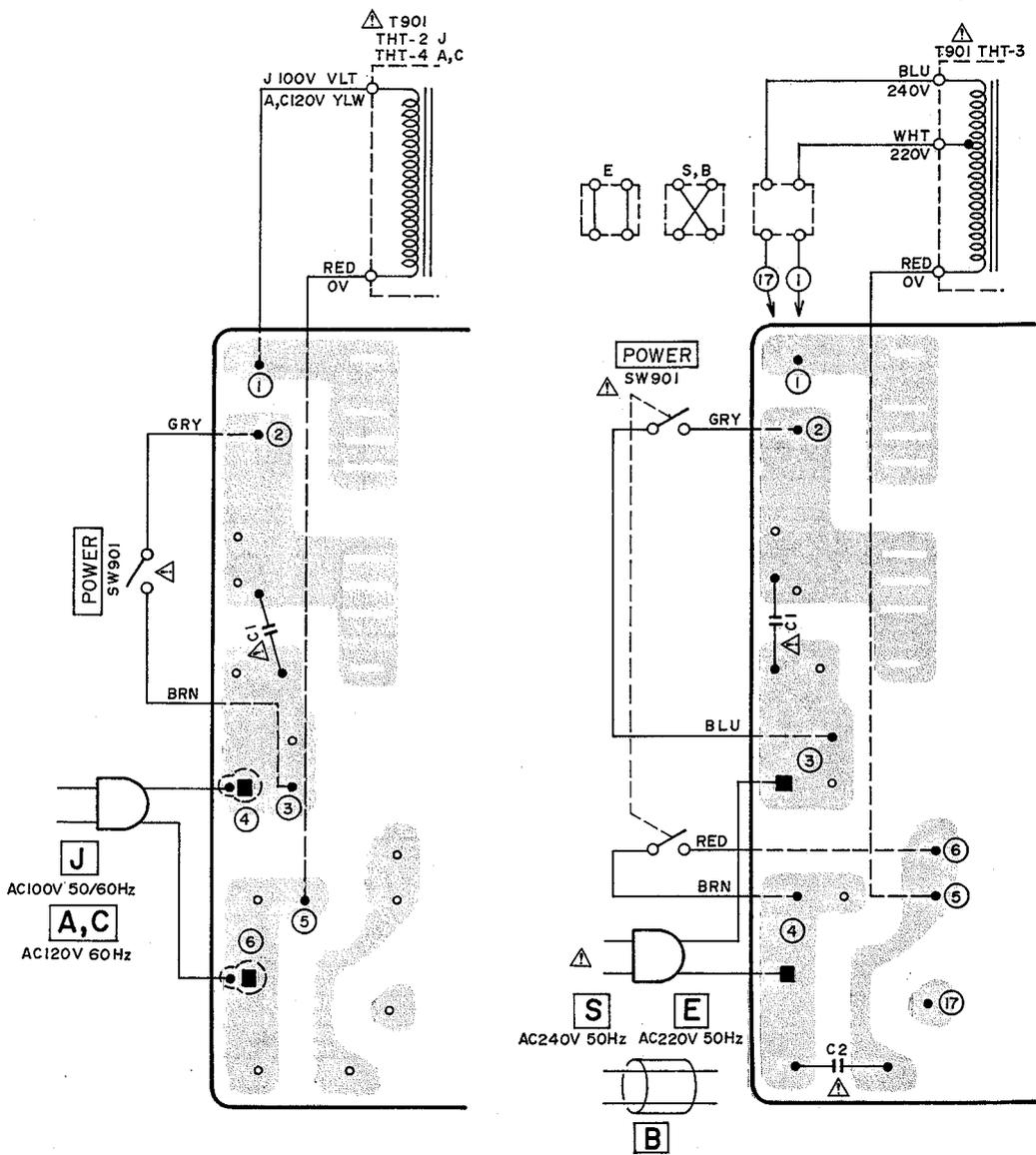


7) Fuse P.C Board TH-2040 (2ED)



WARNING: ⚠ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS

AVERTISSEMENT: ⚠ IL INDIQUE LES COMPOSANTS CRITIQUES DE SÛRETÉ. POUR MAINTENIR LE DEGRÉ DE SÛRETÉ DE L'APPAREIL NE REMPLACER LES COMPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SÛRETÉ QUE PAR DES PIÈCES RECOMMANDÉES PAR LE FABRICANT



WARNING: Δ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY,
 REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S
 RECOMMENDED PARTS

AVERTISSEMENT: Δ IL INDIQUE LES COMPOSANTS CRITIQUES DE SÛRETÉ. POUR
 MAINTENIR LE DEGRÉ DE SÛRETÉ DE L'APPAREIL, NE REMPLACER LES
 COMPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SÛRETÉ
 QUE PAR DES PIÈCES RECOMMANDÉES PAR LE FABRICANT

SECTION 2

PARTS LIST

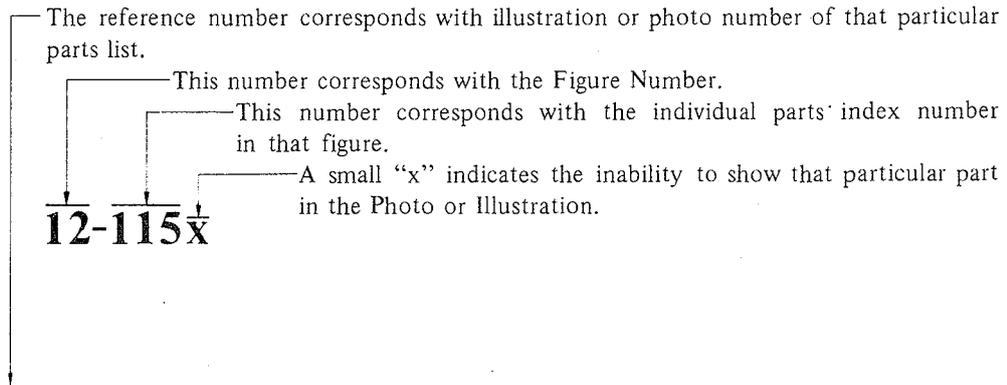
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Resistor and Capacitor which is not listed in this parts list, please refer to
COMMON LIST FOR SERVICE PARTS.

HOW TO USE THIS PARTS LIST

1. This parts list is compiled by various individual blocks based on assembly process.
2. When ordering parts, please describe parts number, serial number, and model number in detail.
3. How to read list.



| Ref. No. | Parts No. | Description |
|---------------------------|-----------|----------------------------|
| FLYWHEEL BLOCK #13 | | |
| 12-115x | 800425 | Flywheel Block Assy. Comp. |
| 12-116 | 244506 | Flywheel Only |
| 12-117x | 244754 | Felt, Flywheel |
| 12-118 | 251324 | Main Metal Case |
| 12-119 | 253080 | Main Metal |

4. The symbol numbers shown on the P.C. Board list can be matched with the Composite Views of components of the Schematic Diagram or Service Manual.
5. The indications of Resistors and Capacitors in the photos of P.C. Board are being eliminated.
6. The shape of the parts and parts name, etc. can be confirmed by comparing them with the parts shown on the Electrical Parts Table of P.C. Board.
7. Both the kind of part and installation position can be determined by the Parts Number. To determine where a parts number is listed, utilize Parts Index at end of Parts List.
It is necessary first of all to find the Parts Number. This can be accomplished by using the Reference Number listed at right of parts number in the Parts Index. (meaning of ref. no. outlined in Item 3 above).
8. Utilize separate "Price List for Parts" to determine unit price. The most simple method of finding parts Price is to utilize the reference number.

CAUTION:

1. When placing an order for parts, be sure to list the parts no., model no., and description. There are instances in which if any of this information is omitted, parts cannot be shipped or the wrong parts will be delivered.
2. Please be careful not to make a mistake in the parts no. If the parts no. is in error, a part different from the one ordered may be delivered.
3. Because parts number and parts unit supply in the Preliminary Service Manual (Basic Parts List) may be partially changed, please use this parts list for all future reference.

WARNING: △ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMEMNDED PARTS.

AVERTISSEMENT: △ IL INDIQU LES COMPOSANTS CRITIQUES DE SURETE. POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL NE REMPLACER LES COMPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT.

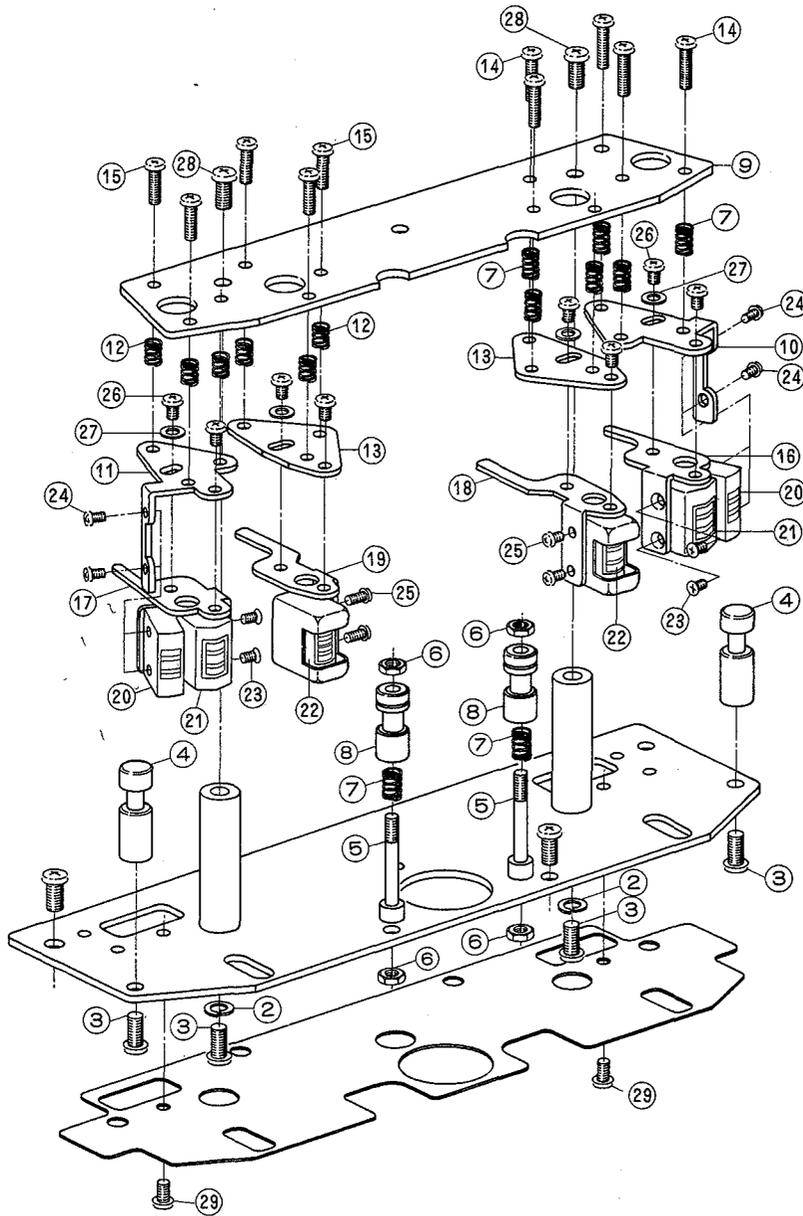
1. RECOMMENDED SPARE PARTS

Because, if the parts listed below are on hand, almost any repair can be accomplished, we suggest that you stock these Recommended Spare Parts Items.

| REF. NO. | PARTS NO. | DESCRIPTION | REF. NO. | PARTS NO. | DESCRIPTION |
|----------|--------------|--|----------|--------------|--------------------------------------|
| 1-1 | BHT1014A260A | HEAD BLK GX-646 | 1-65 | EP316121 | △ SOLENOID 1664PLTI |
| 1-2 | BMM1101A010A | △ MOTOR SCM-200 | 1-66 | EP308973 | RELAY LEAD LAB2NS 2NO 24V |
| 1-3 | BMM1202A010A | △ MOTOR 24XO-TD | 1-67 | EP330351 | RELAY SIGNAL G2KU 1TR 24V |
| 1-4 | BRT1005A110B | REEL TABLE BLK TE (TAKE-UP) | 1-68 | ER330272 | R MFH F10 1/4W 3302F |
| 1-5 | BT308918 | △ TRANS POWER THT-1 (U) | 1-69 | ES313622 | △ SW PUSH JP-27 01-2 J (U,J) |
| 1-6 | BT308919 | △ TRANS POWER THT-2 (J) | 1-70 | ES309058 | △ SW PUSH JP24 02-1 E (E,B,S,V) |
| 1-7 | BT308920 | △ TRANS POWER THT-3 (E,B,S,V) | 1-71 | ES309059 | △ SW PUSH JP27 01-2 UC (C,A) |
| 1-8 | BT308921 | △ TRANS POWER THT-4 (C,A) | 1-72 | ES319464 | SW LEVER 00420460 2-04-02S |
| 1-9 | BZT1008A190A | ROLLER (L) BLK GX-635D | 1-73 | ES319448 | SW LEVER 00420461 2-04-02N |
| 1-10 | BZT1008A190B | ROLLER (L) BLK GX-635D-BL | 1-74 | ES573478 | SW MICRO K3 UC |
| 1-11 | BZT1008A220A | ROLLER (R) BLK GX-635D | 1-75 | ES308929 | SW MICRO VV-S |
| 1-12 | BZT1008A220B | ROLLER (R) BLK GX-635D-BL | 1-76 | ES308925 | SW PUSH SUF12 2-02-02N |
| 1-13 | ED302091 | D GERMA H OA91-LF SNP | 1-77 | ES308914 | SW PUSH SUF12 2-04-02N |
| 1-14 | ED308953 | D GERMA H 1K34A-LH SNP | 1-78 | ES306714 | SW ROTARY SRU1023N 1-02-03N |
| 1-15 | ED302098 | D GERMA V OA91-FV F05 | 1-79 | ES306714 | SW ROTARY SRU1023N 1-02-03N |
| 1-16 | ED308952 | D GERMA V 1K34A-LR F07 | 1-80 | ES324007 | SW ROTARY SRU1023S 1-02-03S |
| 1-17 | ED249377 | D LED GL-3AR1 RED | 1-81 | ES301436 | SW SLIDE CL206E 2-06-02S |
| 1-18 | ED303005 | D LED GL-3HY1 YLW | 1-82 | ES301435 | SW SLIDE CL210E 2-10-02S |
| 1-19 | ED283138 | D LED GL-3PG1 GRN | 1-83 | ES309094 | SW SLIDE SL13-6-6-2-2 2-02-02N (U,J) |
| 1-20 | ED318988 | D LED SR505D RED | 1-84 | ET554657 | TR 2SA733A P,Q |
| 1-21 | ED330319 | D SILICON DBA10B 100/1.0A | 1-85 | ET522268 | TR 2SA733A Q |
| 1-22 | ED301911 | D SILICON H DS448 | 1-86 | ET666415 | TR 2SB605 K,L |
| 1-23 | ED316143 | D SILICON H 1S2473HS F10 | 1-87 | ET318237 | TR 2SB764 E,F |
| 1-24 | ED200468 | D SILICON V DS448 VB3 | 1-88 | ET200399 | TR 2SB856 B,C |
| 1-25 | ED560913 | D SILICON V 1S2473VE | 1-89 | ET312497 | TR 2SC1061 B,C YC40B |
| 1-26 | ED326168 | D SILICON 1D4B1 200/1.5A | 1-90 | ET317919 | TR 2SC1061 C,D |
| 1-27 | ED224550 | D SILICON 10D4 400/1.0A | 1-91 | ET517263 | TR 2SC1312R G,H |
| 1-28 | ED310607 | D ZENER H HZ18 2 | 1-92 | ET603257 | TR 2SC1312S G,H |
| 1-29 | ED332336 | D ZENER H HZ20 3 | 1-93 | ET308954 | TR 2SC1844 E,F |
| 1-30 | ED313623 | D ZENER H HZ22 3 | 1-94 | ET308937 | TR 2SC2130 G,H |
| 1-31 | ED309069 | D ZENER H HZ6 B2 | 1-95 | ET200505 | TR 2SC2603 E,F |
| 1-32 | ED331197 | D ZENER H HZ6 C1 | 1-96 | ET391768 | TR 2SC458LG C,D |
| 1-33 | ED510772 | D ZENER H WZ-120 | 1-97 | ET316171 | TR 2SC536K-NP E,F |
| 1-34 | ED539976 | D ZENER H WZ-130 | 1-98 | ET399846 | TR 2SC945L Q |
| 1-35 | EF300584 | △ FUSE EAK T 250V 1A (E,B,S,V) | 1-99 | ET639437 | TR 2SC945L Q,P |
| 1-36 | EF300591 | △ FUSE EAWK T 250V 0.50A (E,B,S,V) | 1-100 | ET639437 | TR 2SC945L Q,P |
| 1-37 | EF300592 | △ FUSE EAWK T 250V 0.63A (E,B,S,V) | 1-101 | ET666404 | TR 2SD571 K,L |
| 1-38 | EF683313 | △ FUSE SS2 250V 0.80A (C,A) | 1-102 | ET307349 | TR 2SD794 P,Q |
| 1-39 | EF308923 | △ FUSE SS2 250V 1.60A (C,A) | 1-103 | ET328440 | TR 2SD863-V8 E,F |
| 1-40 | EF659698 | △ FUSE SS2 250V 2A (C,A) | 1-104 | EV316442 | R S-FIX H D8 3P 102 |
| 1-41 | EF575932 | △ FUSE TLC A 250V 0.80A (U, J) | 1-105 | EV315542 | R S-FIX H D8 3P 103 |
| 1-42 | EF310455 | △ FUSE TLC A 250V 1.25A (U,J) | 1-106 | EV315753 | R S-FIX H D8 3P 203 |
| 1-43 | EF563681 | △ FUSE TLC A 250V 1A (U,J) | 1-107 | EV322417 | R S-FIX H D8 3P 303 |
| 1-44 | EF562691 | △ FUSE TLC A 250V 2.50A (U) | 1-108 | EV315541 | R S-FIX H D8 3P 503 |
| 1-45 | EF563703 | △ FUSE TLC A 250V 2A (J) | 1-109 | EV309071 | R S-FIX H V18K3-6 (4US) T3P 203 |
| 1-46 | EI304165 | IC MB400M | 1-110 | EV302718 | R S-FIX H V18K3-6 (4US) T3P 503 |
| 1-47 | EI305238 | IC MB417M | 1-111 | EV308917 | VR ROTARY 16L10XOM B102 |
| 1-48 | EI304166 | IC MB418M | 1-112 | EV332364 | VR ROTARY 16P11XOY A503 A503 |
| 1-49 | EI308936 | IC M54410P | 1-113 | EV319316 | VR ROTARY 16P20x2A B103 |
| 1-50 | EI213390 | IC NJM4558D | 1-114 | EV331189 | VR ROTARY 16P20x2B B502 |
| 1-51 | EJ249467 | △ PLUG VOLTAGE SELECTOR S-I7207 3P (U) | 1-115 | EO330991 | C S-FIX H ECR-BC090M11 8.0-90 |
| 1-52 | EJ262732 | △ SOCKET SELECTOR S-I7223 U 7P (U) | 1-116 | HEH1305A010A | HEAD E E4-245 O |
| 1-53 | EJ324276 | DIN J TCS4680-01-111 P 8P | 1-117 | HPH1005A010A | HEAD PB P4-500 O |
| 1-54 | EM330374 | METER VU D64A24L 0.260mA | 1-118 | HRH1101A010A | HEAD REC R4-241 O |
| 1-55 | EM330600 | METER VU D64A27L 0.260mA (BL) | 1-119 | MB308701 | COUNTER BELT |
| 1-56 | EO330990 | COIL FIX 2 0358-042 510μH | 1-120 | MC305642 | COUNTER MP-499-08 |
| 1-57 | EO331190 | COIL OSC 1 2330-065 100kHz | 1-121 | MC305652 | COUNTER MP-499-09 (BL) |
| 1-58 | EO315758 | COIL TUN 1 100S-431 100kHz | 1-122 | MPB424023 | PINCH ROLLER PART KD |
| 1-59 | EO319447 | COIL TUN1 GYD-100K 100kHz | 1-123 | MTT1003A340A | BRAKE CLOTH ASSY GX-215D |
| 1-60 | EO319495 | COIL VARI1 GYD-102 1MHz | | | |
| 1-61 | EP308949 | △ RELAY POWER FBR211BD024-M 1TR 24V | | | |
| 1-62 | EP300132 | △ RELAY POWER MY4-02-US-L 4TR 24V | | | |
| 1-63 | EP330363 | △ SOLENOID 0730FLT2 29V | | | |
| 1-64 | EP315918 | △ SOLENOID 1240PLTI | | | |

When ordering parts, please quote Parts Number, Description and Model Number.

HEAD BLOCK

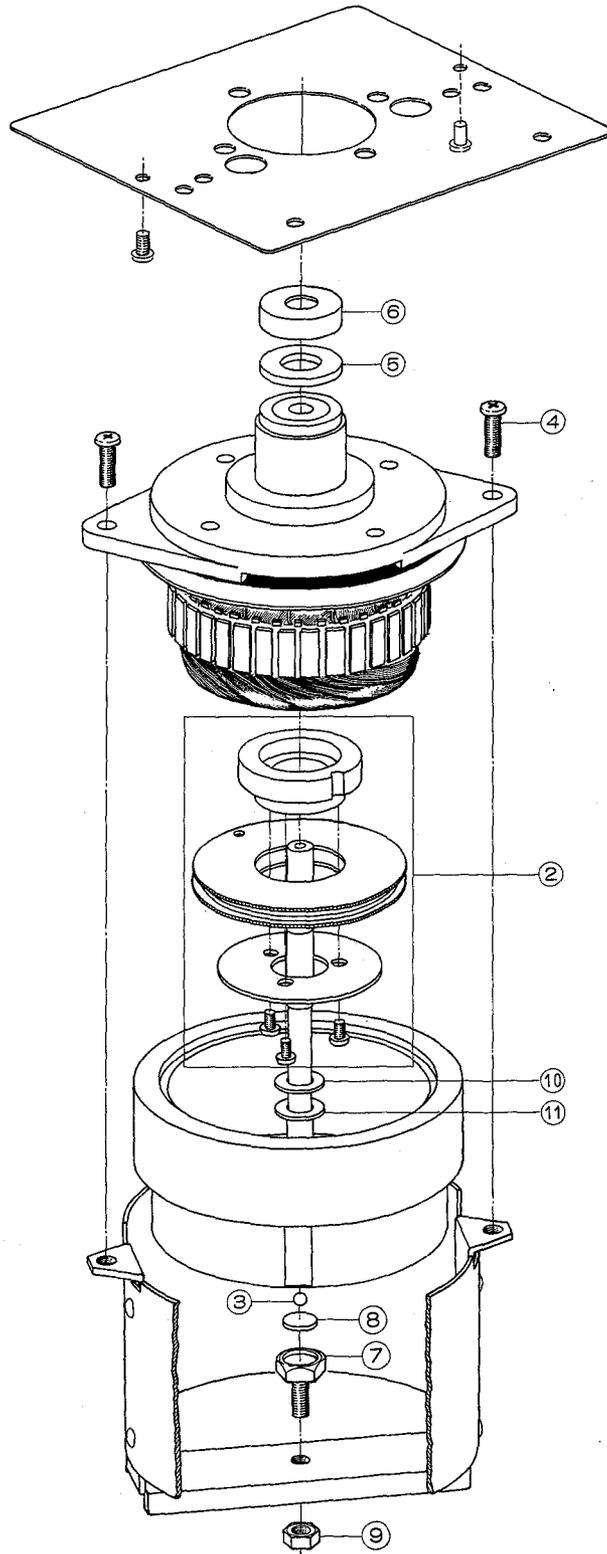


2. HEAD BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION | REF. NO. | PARTS NO. | DESCRIPTION |
|----------|--------------|-------------------------|----------|--------------|---------------------|
| 2-1x | BHT1014A260A | HEAD BLK GX-646 | 2-16 | HA309409 | ER HEAD ANGLE (A) |
| 2-2 | ZW273914 | SW40 | 2-17 | HA309410 | ER HEAD ANGLE (B) |
| 2-3 | ZS413201 | PAN40x08STL CMT | 2-18 | HA330924A | PB HEAD ANGLE (R) |
| 2-4 | HZ528581 | TAPE GUIDE (A) | 2-19 | HA330924B | PB HEAD ANGLE (L) |
| 2-5 | MH578957 | TAPE GUIDE PROP | 2-20 | HEH1305A010A | HEAD E E4-245 O |
| 2-6 | ZW265522 | N30BRS NI 3 2 | 2-21 | HRH101A010A | HEAD REC R4-241 O |
| 2-7 | ZG466312 | ANGLE ADJUST SPRING (E) | 2-22 | HPH1005A010A | HEAD PB P4-500 O |
| 2-8 | HZ301777 | TAPE GUIDE (C) | 2-23 | ZS524812 | CTS20x04STL CMT |
| 2-9 | HZ308681 | HEAD SUB CHASSIS | 2-24 | ZS477876 | PAN20x03STL CMT |
| 2-10 | HB331113A | ER HEAD BASE (A) | 2-25 | ZS608095 | PAN20x05STL CMT |
| 2-11 | HB331113B | ER HEAD BASE (B) | 2-26 | ZS608477 | PAN30x04STL BNI |
| 2-12 | ZG540584 | ANGLE ADJUST SPRING (G) | 2-27 | ZW-309055 | PW30x060x050STL BNI |
| 2-13 | HZ308685 | PB HEAD BASE | 2-28 | ZS201778 | PAN40x08STL BNI |
| 2-14 | ZS608501 | PAN30x12STL BNI | 2-29 | ZS422076 | PAN30x05STL CMT |
| 2-15 | ZS417407 | PAN30x10STL BNI | | | |

When ordering parts, please quote Parts Number, Description and Model Number.

MOTOR BLOCK

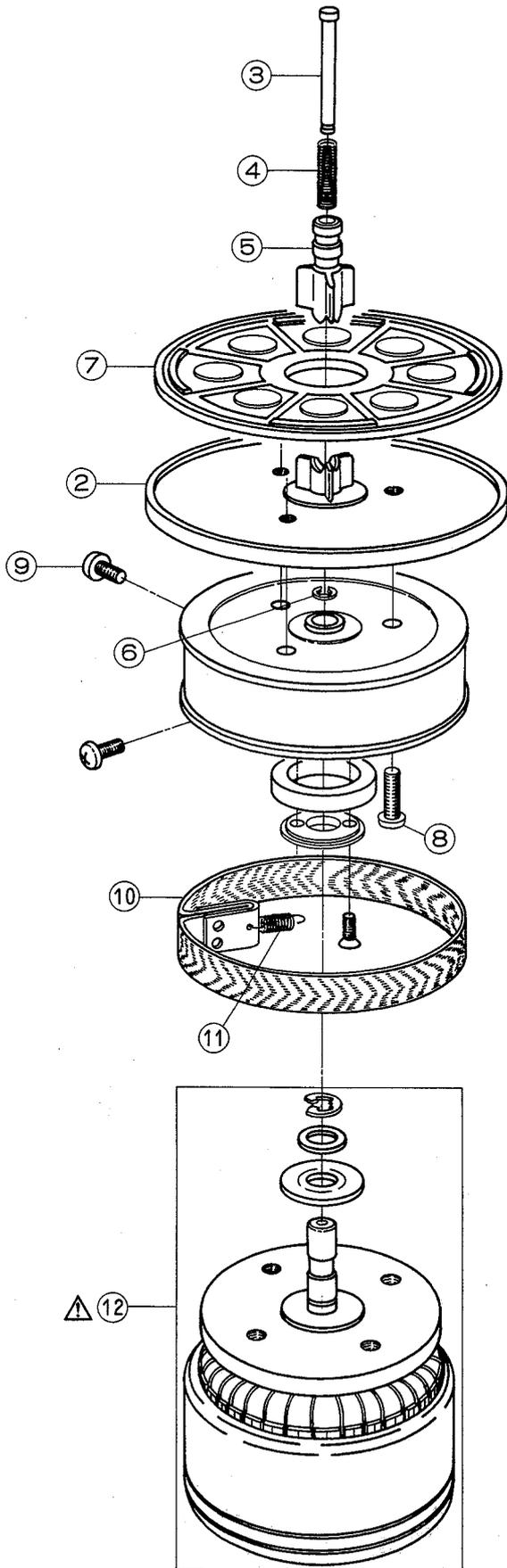


3. MOTOR BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION | REF. NO. | PARTS NO. | DESCRIPTION |
|----------|--------------|----------------------------|----------|-----------|-------------------|
| 3-1x | BMM1101A010A | △ MOTOR SCM-200 | 3-7 | MZ585900 | SHAFT SUPPORT |
| 3-2 | BZM1101A040A | DETECTION GEAR BLK SCM-200 | 3-8 | MZ597690 | BALL HOLDER |
| 3-3 | MV368886 | BALL 300STL | 3-9 | ZW413278 | N50STL CMT 1 |
| 3-4 | ZS413201 | PAN40x08STL CMT | 3-10 | ZW597543 | THRUST WASHER |
| 3-5 | ZW597622 | FELT WASHER | 3-11 | ZW605698 | THRUST WASHER (B) |
| 3-6 | SK597633 | CAP | | | |

When ordering parts, please quote Parts Number, Description and Model Number.

REEL TABLE BLOCK

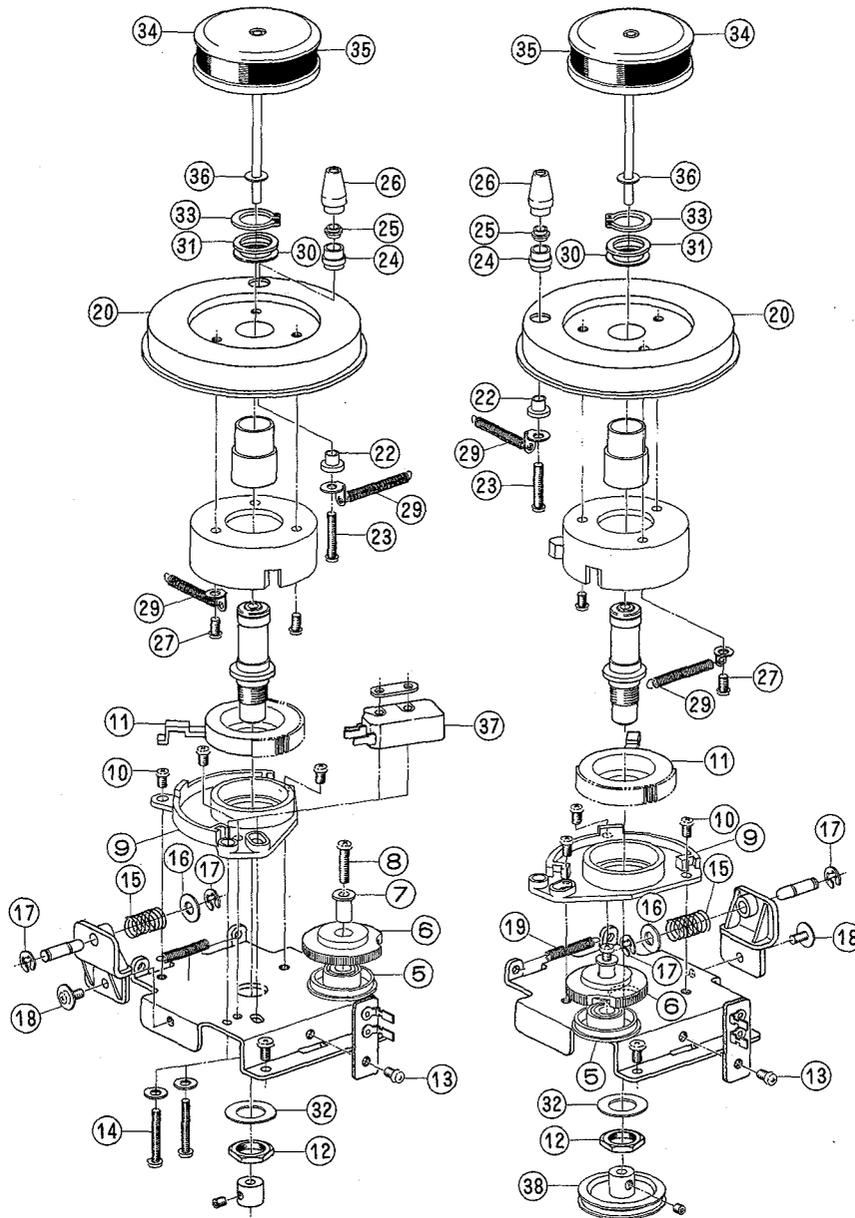


4. REEL TABLE BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|----------|--------------|-----------------------------|
| 4-1x | BRT1005A110B | REEL TABLE BLK TE (TAKE-UP) |
| 4-2 | MT534666 | REEL TABLE |
| 4-3 | MS342000 | REEL SHAFT |
| 4-4 | ZG540617 | CLAMPER SPRING |
| 4-5 | MT534677 | REEL CLAMPER |
| 4-6 | ZW270088 | RING E 190SUP CMT |
| 4-7 | MT534688 | REEL TABLE RUBBER |
| 4-8 | ZS419670 | PAN30x12STL CMT |
| 4-9 | ZS424056 | PAN40x10STL CMT |
| 4-10 | MTT1003A340A | BRAKE CLOTH ASSY GX-215D |
| 4-11 | ZG317496 | FELT TENSION SPRING |
| 4-12 | BMM1202A010A | ⚠ MOTOR 24XO-TD |

When ordering parts, please quote Parts Number, Description and Model Number.

ROLLER (L/R) BLOCK

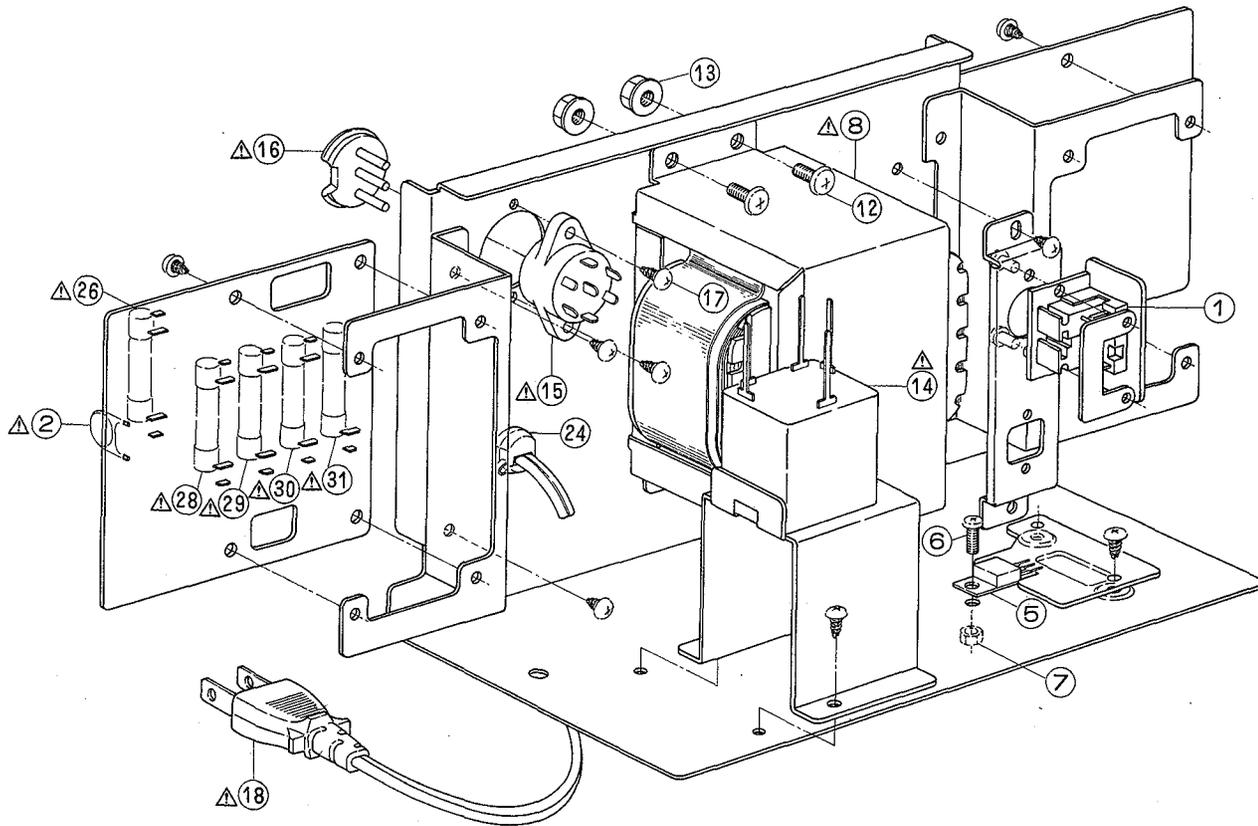


5. ROLLER (L/R) BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION | REF. NO. | PARTS NO. | DESCRIPTION |
|----------|--------------|---------------------------|----------|-----------|---------------------------|
| 5-1x | BZT1008A190A | ROLLER (L) BLK GX-635D | 5-21x | MI315558 | TENSION WHEEL (BL) |
| 5-2x | BZT1008A190B | ROLLER (L) BLK GX-635D-BL | 5-22 | EZ308712 | INSULATOR BUSH |
| 5-3x | BZT1008A220A | ROLLER (R) BLK GX-635D | 5-23 | ZS422965 | PAN30x15STL CMT |
| 5-4x | BZT1008A220B | ROLLER (R) BLK GX-635D-BL | 5-24 | HZ308710 | TAPE GUIDE (B) |
| 5-5 | MZ315375 | DAMPER GEAR BASE | 5-25 | MZ535072 | INSULATOR BUSH (A) |
| 5-6 | MZ315374 | DAMPER GEAR | 5-26 | HZ308709 | TAPE GUIDE (A) |
| 5-7 | MS315376 | DAMPER SHAFT | 5-27 | ZS479474 | PAN26x05STL CMT |
| 5-8 | ZS419670 | PAN30x12STL CMT | 5-28x | ZS572242 | CTS26x06STL CMT |
| 5-9 | SZ308717 | ARM DAMPER BASE | 5-29 | ZG312399 | SP T1-3.2/0.2-31.5 T1-049 |
| 5-10 | ZS417216 | PAN30x04STL CMT | 5-30 | ZW313873 | PW105x140x050NYL |
| 5-11 | MZ315373 | ARM GEAR | 5-31 | ZW313872 | PW105x140x013PSL |
| 5-12 | ZW318099 | NUT M9 | 5-32 | ZW330865 | PW105x140x10PBR |
| 5-13 | ZS417216 | PAN30x04STL CMT | 5-33 | ZW307294 | RING C 930SUP PKR |
| 5-14 | ZS319473 | BID26x18STL CMT | 5-34 | MR308713 | COUNTER ROLLER |
| 5-15 | ZG308722 | LOCK SPRING | 5-35 | MB308714 | ROLLER BELT |
| 5-16 | ZW308930 | PW42x090x025PBR | 5-36 | ZW308928 | PW24x070x020TFL |
| 5-17 | ZW270101 | RING E300SUP CMT | 5-37 | ES308929 | SW MICRO VV-S |
| 5-18 | ZS608321 | PAN30x06STL CMT PW080 | 5-38 | MR308715 | ROLLER PULLEY |
| 5-19 | ZG567685 | AZIMUTH SPRING (1) | | | |
| 5-20 | MI308707 | TENSION WHEEL | | | |

When ordering parts, please quote Parts Number, Description and Model Number.

POWER BLOCK

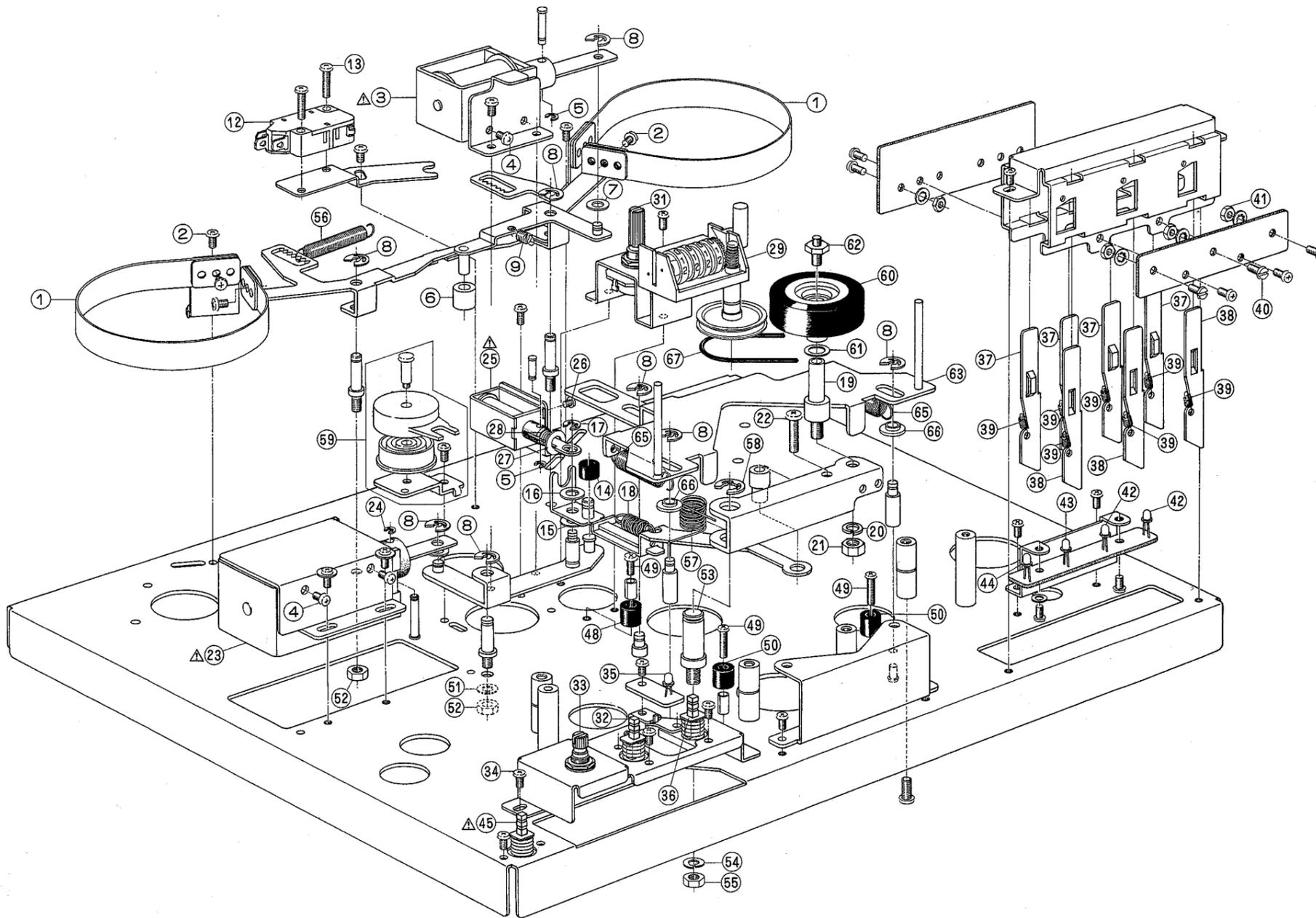


6. POWER BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION | REF. NO. | PARTS NO. | DESCRIPTION |
|--------------------------------|-----------|---|----------|-----------|--|
| REMOCON P.C BOARD BLOCK | | | | | |
| 6-1 | EJ324276 | DIN J TCS4680-01-111 P 8P | 6-22x | EW313884 | △ AC CORD 2 CORES GTBS-2F 24/0.20x2 B (B) |
| FUSE P.C BOARD BLOCK | | | | | |
| 6-2 | EC320548 | △ C CE V F 103Z 250AC (C1)(U,J) | 6-23x | EW201515 | △ AC CORD 2 CORES KP-560, LTSA-2F S (S) |
| 6-3x | EC314688 | △ C CE V FZ 103P 125AC (C1)(C,A) | 6-24 | SZ631945 | STRAIN RELIEF SR-4N-4 (U,J,C,A,E,S,V) |
| 6-4x | EC327382 | △ C MP V 472M 250AC (C1,2) (E,B,S,V) | 6-25x | EJ692908 | STRAIN RELIEF SR-5N-4 (B) |
| POWER BLOCK | | | | | |
| 6-5 | ET308947 | TR 2SC2336B Q,R | 6-26 | EF562691 | △ FUSE TLC A 250V 2.50A (F1)(U) |
| 6-6 | ZS421806 | PAN30x08STL CMT | 6-27x | EF310455 | △ FUSE TLC A 250V 1.25A (F1)(U) |
| 6-7 | ZW516993 | N30STL CMT 1 | 6-28 | EF616555 | △ FUSE TLC A 250V 1.60A (F2)(U) |
| 6-8 | BT308918 | △ TRANS POWER THT-1 (U) | 6-29 | EF575932 | △ FUSE TLC A 250V 0.80A (F3)(U) |
| 6-9x | BT308919 | △ TRANS POWER THT-2 (J) | 6-30 | EF563681 | △ FUSE TLC A 250V 1A (F4)(U) |
| 6-10x | BT308921 | △ TRANS POWER THT-4 (C,A) | 6-31 | EF575932 | △ FUSE TLC A 250V 0.80A (F5)(U) |
| 6-11x | BT308920 | △ TRANS POWER THT-3 (E,B,S,V) | 6-32x | EF563703 | △ FUSE TLC A 250V 2A (F1)(J) |
| 6-12 | ZS435273 | BID40x10STL CMT | 6-33x | EF616555 | △ FUSE TLC A 250V 1.60A (F2)(J) |
| 6-13 | ZW413267 | N FRANGE 40STL CMT | 6-34x | EF575932 | △ FUSE TLC A 250V 0.80A (F3)(J) |
| 6-14 | EC316065 | △ C MMY V HFV SPECIAL 250AC (C901) | 6-35x | EF563681 | △ FUSE TLC A 250V 1A (F4)(J) |
| 6-15 | EJ262732 | △ SOCKET SELECTOR S-I7223 U 7P (VS901)(U) | 6-36x | EF575932 | △ FUSE TLC A 250V 0.80A (F5)(J) |
| 6-16 | EJ249467 | △ PLUG VOLTAGE SELECTOR S-I7207 3P (U) | 6-37x | EF659698 | △ FUSE SS2 250V 2A (F1)(C,A) |
| 6-17 | ZS463353 | T2BR30x08STL BNI | 6-38x | EF308923 | △ FUSE SS2 250V 1.60A (F2)(C,A) |
| 6-18 | EW306428 | △ AC CORD 2 CORES KP-205A, VFF J (U) | 6-39x | EF683313 | △ FUSE SS2 250V 0.80A (F3to5) (C,A) |
| 6-19x | EW306427 | △ AC CORD 2 CORES KP-211, VFF J (J) | 6-40x | EF300592 | △ FUSE EAWK T 250V 0.63A (F1) (E,B,S,V) |
| 6-20x | EW305691 | △ AC CORD 2 CORES KP-8, SPT-1 UC (C,A) | 6-41x | EF300584 | △ FUSE EAK T 250V 1A (F2) (E,B,S,V) |
| 6-21x | EW313882 | △ AC CORD 2 CORES KP-419C, LTCE-2F E (E,V) | 6-42x | EF300591 | △ FUSE EAWK T 250V 0.50A (F3) (E,B,S,V) |
| | | | 6-43x | EF300584 | △ FUSE EAK T 250V 1A (F4)(E,B,S,V) |
| | | | 6-44 | EF300591 | △ FUSE EAWK T 250V 0.50A (F5) (E,B,S,V) |

When ordering parts, please quote Parts Number, Description and Model Number.

MECHA BLOCK



7. MECHA BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|----------------------------|-----------|---------------------|
| BRAKE LEVER BLOCK | | |
| 7-1 | MT314987 | BRAKE BAND |
| 7-2 | ZS417216 | PAN30x04STL CMT |
| BRAKE PLUNGER BLOCK | | |
| 7-3 | EP315918 | △ SOLENOID 1240PLTI |
| 7-4 | ZS422076 | PAN30x05STL CMT |
| 7-5 | ZW270088 | RING E 190SUP CMT |
| 7-6 | MZ397181 | LEVER CUSHION |
| 7-7 | ZW420682 | PW42x090x050NYL |
| 7-8 | ZW290283 | RING U 285SUP CMT |
| 7-9 | ZG580522 | CLUTCH LEVER SPRING |
| 7-10x | ZW616004 | PW31x080x100STL CMT |
| 7-11x | ZS323728 | BID30x05STL CMT |

| REF. NO. | PARTS NO. | DESCRIPTION |
|------------------------------|-----------|--------------------|
| SWITCH PLATE BLOCK | | |
| 7-12 | ES573478 | SW MICRO K3 UC |
| 7-13 | ZS419670 | PAN30x12STL CMT |
| P PLUNGER LEVER BLOCK | | |
| 7-14 | MB428343 | KD STOPPER RUBBER |
| 7-15 | ZW405865 | PW51x103x050NYL |
| 7-16 | ZW260043 | PW61x100x020NYL |
| 7-17 | ZW270123 | RING E400SUP CMT |
| 7-18 | ZG308728 | P SPRING |
| 7-19 | MS527591 | PINCH ROLLER SHAFT |
| 7-20 | ZW274026 | SW50 |
| 7-21 | ZW413278 | N50STL CMT 1 |
| 7-22 | ZS444262 | BID40x18STL CMT |

| REF. NO. | PARTS NO. | DESCRIPTION |
|----------------------------|-----------|-------------------------|
| PR PLUNGER BLOCK | | |
| 7-23 | EP316121 | △ SOLENOID 1664PLT1 |
| 7-24 | ZW357164 | RING E230SUP CMT |
| PAUSE PLUNGER BLOCK | | |
| 7-25 | EP330363 | △ SOLENOID 0730FLT2 29V |
| 7-26 | ZS592378 | PAN26x03STL CMT |
| 7-27 | ZW313593 | PW51x103x050PBR |
| 7-28 | ZG308734 | JOINT SPRING |
| COUNTER BLOCK | | |
| 7-29 | MC305642 | COUNTER MP-499-08 |
| 7-30x | MC305652 | COUNTER MP-499-09 (BL) |

| REF. NO. | PARTS NO. | DESCRIPTION |
|--------------------------------------|--------------|---------------------------------|
| VOLUME ASSY | | |
| 7-31 | EV308917 | VR ROTARY 16L10XOMB102 |
| SWITCH BLOCK | | |
| 7-32 | ES308914 | SW PUSH SUF12 2-04-02N |
| 7-33 | ES324007 | SW ROTARY SRU1023S 1-02-03S |
| 7-34 | ZS422076 | PAN30x05STL CMT |
| 7-35 | ED318988 | D LED SR505D RED |
| 7-36 | ES308925 | SW PUSH SUF12 2-02-02N |
| OPERATION BLOCK | | |
| 7-37 | ML308737 | OPERATION PLATE (A) |
| 7-38 | ML308677 | OPERATION PLATE (B) |
| 7-39 | ZG576314 | FF IDLER SPRING |
| OPERATION P.C BOARD (A) BLOCK | | |
| 7-40 | ZG302720 | -FLL30x06STL BNI |
| 7-41 | ZW273756 | N30BRS 1 |
| LED P.C BOARD BLOCK | | |
| 7-42 | ED283138 | D LED GL-3PG1 GRN |
| 7-43 | ED303005 | D LED GL-3HY1 YLW |
| 7-44 | ED249377 | D LED GL-3AR1 RED |
| POWER SWITCH ASSY | | |
| 7-45 | ES313622 | △ SW PUSH JP-27 01-2 J (U,J) |
| 7-46x | ES309059 | △ SW PUSH JP2 7 01-2 UC (C,A) |
| 7-47x | ES309058 | △ SW PUSH JP24 02-1 E (E,B,S,V) |
| ASSEMBLY BLOCK | | |
| 7-48 | MB606712 | KJ STOPPER RUBBER |
| 7-49 | ZS419670 | PAN30x12STL CMT |
| 7-50 | MB428343 | KD STOPPER RUBBER |
| 7-51 | ZW273914 | SW40 |
| 7-52 | ZW413188 | N40STL CMT 1 |
| 7-53 | MS308695 | PINCH ROLLER ARM SHAFT |
| 7-54 | ZW274026 | SW50 |
| 7-55 | ZW413278 | N50STL CMT 1 |
| 7-56 | ZG313078 | SP T1-6.3/0.5-50.0 T1-190 |
| 7-57 | ZG301340 | PINCH ROLLER SPRING |
| 7-58 | ZW270156 | RING E 600SUP CMT |
| 7-59 | BZT1009A080A | PR DAMPER BL K GX-747 |
| 7-60 | MPB424023 | PINCH ROLLER PART KD |
| 7-61 | ZW376391 | PW61x100x013P SL |
| 7-62 | ZS527681 | PINCH ROLLER SET SCREW |
| 7-63 | MLB330939 | SHIFTER SLIDE PART |
| 7-64x | VT422673 | BRAKE RUBBER BUSH |
| 7-65 | ZG317114 | TENSION LEVER SPRING |
| 7-66 | ZW580173 | GUIDE WASHER |
| 7-67 | MB308701 | COUNTER BELT |

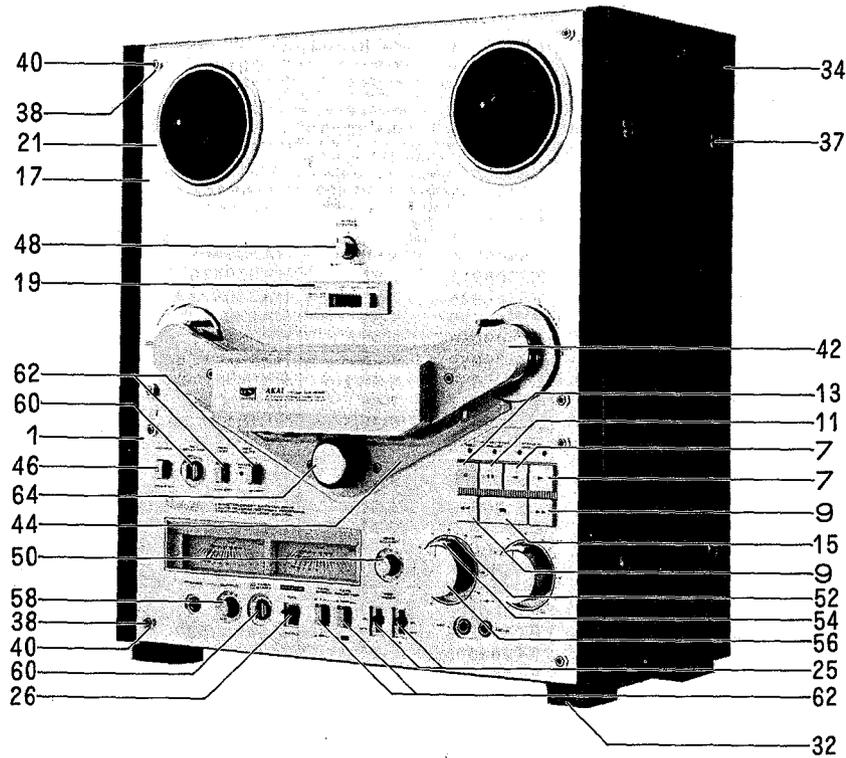
When ordering parts, please quote Parts Number, Description and Model Number.

8. SYS. CON. P.C BOARD BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION | REF. NO. | PARTS NO. | DESCRIPTION |
|------------|--------------|---|-------------|-----------|--|
| 8-1 | BAT1014A130A | PC SYSCON BLK GX-646 (U) (U,J) | 8-R112 | ER308955 | R CT P 20W 360K |
| 8-2 | BAT1014A130B | PC SYSCON BLK GX-646 (C) (C,A) | 8-FR1 | ER561216 | △ R FUSE FRN50 200mA 1/4W 101K |
| 8-3 | BAT1014A130C | PC SYSCON BLK GX-646 (E) (E,B,S,V) | 8-C35to37 | EC304708 | C TT V D 470M 6.3DC |
| 8-IC1 | EI308936 | IC M54410P | 8-C39,40 | EC313534 | C EC V F05 NP 04D 100M 16DC |
| 8-IC2,3 | EI304165 | IC MB400M | 8-C44,45 | EC308940 | C EC V F05 NP 04D R47M 50DC |
| 8-IC4 | EI305238 | IC MB417M | 8-C46,47 | EC308950 | C TT V D 100M 6.3DC |
| 8-IC5 | EI304166 | IC MB418M | 8-C48 | EC301912 | C EC V SNP NM 471 160DC |
| 8-TR1 | ET312497 | △ TR 2SC1061 B,C YC40B | 8-C49 | EC321297 | C EC V CUT H 470M 100DC |
| 8-TR2 | ET200505 | TR 2SC2603 E,F | 8-C52 | EC310366 | C MMY V MEU 474M 150AC |
| 8-TR3 | ET307349 | △ TR 2SD794 P,Q | 8-C53 | EC310374 | C TT V D 101M 3.1DC |
| 8-TR4to8 | ET200505 | TR 2SC2603 E,F | 8-C101to124 | EC201390 | C MMY V MEU 104M 150AC (E,B,S,V) |
| 8-TR9,10 | ET554657 | TR 2SA733A P,Q | 8-C130,131 | EC316194 | C MMY V CUT CF921 474K 250DC |
| 8-TR11 | ET200505 | TR 2SC2603 E,F | 8-C132 | EC321088 | C MMY V CF921 473K 400DC |
| 8-TR12 | ET554657 | TR 2SA733A P,Q | 8-CR1to12 | ER310373 | △ SPARK QUENCHER NSK115 104C+121R 125AC |
| 8-TR14,15 | ET200505 | TR 2SC2603 E,F | | | |
| 8-TR16to19 | ET308937 | TR 2SC2130 G,H | | | |
| 8-TR20 | ET522268 | TR 2SA733A Q | | | |
| 8-TR21 | ET399846 | TR 2SC945L Q | | | |
| 8-TR22 | ET308937 | TR 2SC2130 G,H | | | |
| 8-TR23 | ET200505 | TR 2SC2603 E,F | | | |
| 8-TR24, 25 | ET308937 | TR 2SC2130 G,H | | | |
| 8-TR26to33 | ET200505 | TR 2SC2603 E,F | | | |
| 8-D1 | ED330319 | D SILICON DBA10B 100/1.0A | | | |
| 8-D2 | ED313623 | D ZENER H HZ22 3 | | | |
| 8-D3 | ED330319 | △ D SILICON DBA10B 100/1.0A | | | |
| 8-D4 | ED309069 | D ZENER H HZ6 B2 | | | |
| 8-D5 | ED539976 | D ZENER H WZ-130 | | | |
| 8-D6 | ED510772 | D ZENER H WZ-120 | | | |
| 8-D7,8 | ED200468 | D SILICON V DS448 VB3 | | | |
| 8-D9 | ED326168 | △ D SILICON 1D4B1 200/1.5A | | | |
| 8-D13 | ED302091 | △ D GERMA H OA91-LF SNP | | | |
| 8-D14 | ED302098 | D GERMA V OA91-FV F05 | | | |
| 8-D15 | ED301911 | D SILICON H DS448 | | | |
| 8-D16 | ED200468 | D SILICON V DS448 VB3 | | | |
| 8-D17 | ED302098 | D GERMA V OA91-FV F05 | | | |
| 8-D18 | ED301911 | D SILICON H DS448 | | | |
| 8-D19to22 | ED200468 | D SILICON V DS448 VB3 | | | |
| 8-D24 | ED301911 | D SILICON H DS448 | | | |
| 8-D26,27 | ED200468 | D SILICON V DS448 VB3 | | | |
| 8-D28 | ED302091 | D GERMA H OA91-LF SNP | | | |
| 8-D29to32 | ED200468 | D SILICON V DS448 VB3 | | | |
| 8-D33,34 | ED302098 | D GERMA V OA91-FV F05 | | | |
| 8-D35 | ED301911 | D SILICON H DS448 | | | |
| 8-D36to38 | ED302098 | D GERMA V OA91-FV F05 | | | |
| 8-D39,40 | ED560913 | D SILICON V 1S2473VE | | | |
| 8-D41 | ED200468 | D SILICON V DS448 VB3 | | | |
| 8-D42 | ED302091 | D GERMA H OA91-LF SNP | | | |
| 8-D43 | ED200468 | D SILICON V DS448 VB3 | | | |
| 8-D44 | ED302098 | D GERMA V OA91-FV F05 | | | |
| 8-D45 | ED302091 | D GERMA H OA91-LF SNP | | | |
| 8-D46 | ED302098 | D GERMA V OA91-FV F05 | | | |
| 8-D47,48 | ED200468 | D SILICON V DS448 VB3 | | | |
| 8-D49 | ED306109 | D SILICON W03B 100/1.0A | | | |
| 8-D50 | ED326168 | △ D SILICON 1D4B1 200/1.5A | | | |
| 8-D51,52 | ED224550 | D SILICON 10D4 400/1.0A | | | |
| 8-D53 | ED200468 | D SILICON V DS448 VB3 | | | |
| 8-D54 | ED224550 | D SILICON 10D4 400/1.0A | | | |
| 8-D56 | ED224550 | D SILICON 10D4 400/1.0A | | | |
| 8-D57 | ED200468 | D SILICON V DS448 VB3 | | | |
| 8-D60 | ED200468 | D SILICON V DS448 VB3 | | | |
| 8-SW1 | ES309094 | SW SLIDE SL13-6-6-2-2 2-02-02N (U,J) | | | |
| 8-VR1 | EV302718 | R S-FIX H V18K3-6(4US) T3P 503 | | | |
| 8-VR2 | EV309071 | R S-FIX H V18K3-6(4US) T3P 203 | | | |
| 8-RL1to4 | EP300132 | △ RELAY POWER MY4-02-US-L 4TR 24V | | | |
| 8-RL5 | EP308949 | △ RELAY POWER FBR211BD024-M 1TR 24V | | | |
| 8-R28 | ER330680 | △ R CB H FS RDS 1/4W 331J | | | |
| 8-R29 | ER330677 | △ R CB H FS RDS 1/4W 181J | | | |
| 8-R110 | ER309092 | R OMF H 2W 821K | | | |
| 8-R111 | ER315356 | R CT P 20W 551K | | | |

When ordering parts, please quote Parts Number, Description and Model Number.

FINAL ASSEMBLY BLOCK



13. FINAL ASSEMBLY BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION | REF. NO. | PARTS NO. | DESCRIPTION |
|-----------------------------|--------------|---|----------|-----------|--------------------------------|
| AMP PANEL BLOCK | | | | | |
| 13-1 | BDT1014A420A | AMP PANEL BLK GX-646 (U) (EXCEPT J) | 13-34 | SP308805 | SIDE PLATE |
| 13-2x | BDT1014A420B | AMP PANEL BLK GX-646 (J) (J) | 13-35x | SP315587 | SIDE PLATE (BL) |
| 13-3x | BDT1014A420C | AMP PANEL BLK GX-646-BL (U) (EXCEPT J) | 13-36x | SP305022 | SIDE PLATE (B) |
| 13-4x | BDT1014A420D | AMP PANEL BLK GX-646-BL (J) (J) | 13-37 | ZS318423 | SCREW(B), W/SPOT FACING WASHER |
| 13-5 | SE315562 | OPERATE ESCUTCHEON (BL) | 13-38 | ZS613901 | PANEL SCREW |
| 13-6x | SE332776B | ESCUTCHEON KNOB (BL) | 13-39x | ZS306435 | PANEL SCREW (C) |
| 13-7 | SBB601311 | OPERATE BUTTON (F) PART | 13-40 | TC331106A | PANEL WASHER |
| 13-8x | SBB314002 | OPERATE BUTTON (A-BL) PART | 13-41 | ZW331106B | PANEL WASHER (BL) |
| 13-9 | SBB601313 | OPERATE BUTTON (G) PART | 13-42 | BCB604307 | BASE HEAD COVER PART |
| 13-10x | SBB314004 | OPERATE BUTTON (B-BL) PART | 13-43x | BCB604308 | BASE HEAD COVER (BL) PART |
| 13-11 | SBB601314 | OPERATE BUTTON (H) PART | 13-44 | SC332767A | BASE HEAD COVER |
| 13-12x | SBB314005 | OPERATE BUTTON (C-BL) PART | 13-45x | SC332767B | BASE HEAD COVER (BL) |
| 13-13 | SBB601315 | OPERATE BUTTON (I) PART | 13-46 | SB315828 | BUTTON (B) |
| 13-14x | SBB314006 | OPERATE BUTTON (D-BL) PART | 13-47x | SB315829 | BUTTON (B-BL) |
| 13-15 | SBB601316 | OPERATE BUTTON (J) PART | 13-48 | SK305027A | KNOB (B) |
| 13-16x | SBB314003 | OPERATE BUTTON (E-BL) PART | 13-49x | SK305027B | KNOB (B-BL) |
| MECHA PANEL BLOCK | | | | | |
| 13-17 | BDT1014A430A | MECHA PANEL BLK GX-646 | 13-50 | SK331108D | KNOB (A-4) |
| 13-18x | BDT1014A430B | MECHA PANEL BLK GX-646-BL | 13-51x | SK331108B | KNOB (A-2) |
| 13-19 | SE305035A | COUNTER ESCUTCHEON | 13-52 | SK332773A | KNOB MEMORY |
| 13-20x | SE305035B | COUNTER ESCUTCHEON (BL) | 13-53x | SK332773B | KNOB MEMORY (BL) |
| 13-21 | SE315931 | REEL TABLE ESCUTCHEON (2-C) | 13-54 | SK332770A | KNOB DOUBLE (LOWER) |
| 13-22x | SE315577 | REEL TABLE ESCUTCHEON (2-D) | 13-55x | SK332770B | KNOB DOUBLE (LOWER)-BL |
| 13-23x | ZW575730 | N SPEED 30 | 13-56 | SK315822 | DOUBLE KNOB (UPPER) |
| FINAL ASSEMBLY BLOCK | | | | | |
| 13-24x | SA312529 | RUBBER FOOT (A-2) PART | 13-57x | SK315823 | DOUBLE KNOB (UPPER-BL) |
| 13-25 | SK328684 | KNOB LEVER (C) | 13-58 | SK331108C | KNOB (A-3) |
| 13-26 | ML328683 | KNOB LEVER (B) | 13-59x | SK331108A | KNOB (A-1) |
| 13-27x | SP304933A | UPPER COVER | 13-60 | SK331109F | KNOB (E) |
| 13-28x | SP304933B | UPPER COVER (BL) | 13-61x | SK331109C | KNOB (C) |
| 13-29x | ZS331181 | BT BID30x08STL NI3 | 13-62 | SK332775A | KNOB |
| 13-30 | SP304928A | BOTTOM COVER | 13-63x | SK332775B | KNOB (BL) |
| 13-31x | SP304928B | BOTTOM COVER (BL) | 13-64 | SKB601364 | PINCH ROLLER CAP (D) PART |
| 13-32 | SAB301411 | SQUARE FOOT PART GX-215D | 13-65x | SKB601365 | PINCH ROLLER CAP (E) PART |
| 13-33x | ZS413234 | PAN40x12STL CMT | 13-66x | SP331078F | BACK BOARD GX-646 (U) |
| | | | 13-67x | SP331078G | BACK BOARD GX-646 (J) |
| | | | 13-68x | SP331078H | BACK BOARD GX-646 (C,A) |
| | | | 13-69x | SP331078J | BACK BOARD GX-646 (E) |
| | | | 13-70x | SP331078K | BACK BOARD GX-646 (B,S) |
| | | | 13-71x | SP331078L | BACK BOARD GX-646 (V) |
| | | | 13-72x | ZS331568 | T2BR30x10STL CMT C080 |

When ordering parts, please quote Parts Number, Description and Model Number.

INDEX

| PARTS NO. | REF. NO. | PARTS NO. | REF. NO. | PARTS NO. | REF. NO. | PARTS NO. | REF. NO. | PARTS NO. | REF. NO. |
|--------------|------------|-----------|-----------|-----------|------------|--------------|----------|-----------|----------|
| BAT1014A130A | 8-1 | ED302091 | 8-D28 | ER309092 | 8-R110 | EV331189 | 11-VR1 | SE315931 | 13-21 |
| BAT1014A130B | 8-2 | ED302091 | 8-D42 | ER310373 | 8-CR1to12 | EV332364 | 11-VR1,2 | SE332771A | 12-11 |
| BAT1014A130C | 8-3 | ED302091 | 8-D45 | ER315356 | 8-R111 | EW201515 | 6-23x | SE332771B | 12-12x |
| BAT1014A300A | 10-1 | ED302098 | 8-D14 | ER330677 | 8-R29 | EW305691 | 6-20x | SE332776B | 13-6x |
| BAT1014A350A | 9-1 | ED302098 | 8-D17 | ER330680 | 8-R28 | EW306427 | 6-19x | SKB601364 | 13-64 |
| BAT1014A350B | 9-2 | ED302098 | 8-D33,34 | ER331188 | 9-FR2, 3 | EW306428 | 6-18 | SKB601365 | 13-65x |
| BAT1014A350C | 9-3 | ED302098 | 8-D36to38 | ER331562 | 9-R7 | EW313882 | 6-21x | SK305027A | 13-48 |
| BAT1014A400A | 11-1 | ED302098 | 8-D44 | ER561216 | 8-FR1 | EW313884 | 6-22x | SK305027B | 13-49x |
| BAT1014A400B | 11-2 | ED302098 | 8-D46 | ES301435 | 9-SW1 | EZ308712 | 5-22 | SK315822 | 13-56 |
| BCB604307 | 13-42 | ED303005 | 7-43 | ES301436 | 9-SW7 | EO330991 | 9-VC1,2 | SK315823 | 13-57x |
| BCB604308 | 13-43x | ED306109 | 8-D49 | ES306714 | 9-SW6 | HA309409 | 2-16 | SK328684 | 13-25 |
| BDT1014A420A | 13-1 | ED308952 | 10-D11 | ES308914 | 7-32 | HA309410 | 2-17 | SK331108A | 13-59x |
| BDT1014A420B | 13-2x | ED308953 | 9-D4,5 | ES308925 | 7-36 | HA330924A | 2-18 | SK331108B | 13-51x |
| BDT1014A420C | 13-3x | ED309069 | 8-D4 | ES308929 | 5-37 | HA330924B | 2-19 | SK331108C | 13-58 |
| BDT1014A420D | 13-4x | ED310607 | 10-D10 | ES309058 | 7-47x | HB331113A | 2-10 | SK331108D | 13-50 |
| BDT1014A430A | 13-17 | ED313623 | 8-D2 | ES309059 | 7-46x | HB331113B | 2-11 | SK331109C | 13-61x |
| BDT1014A430B | 13-18x | ED316143 | 9-D7,8 | ES309094 | 8-SW1 | HEH1305A010A | 2-20 | SK331109F | 13-60 |
| BHT1014A260A | 2-1x | ED316143 | 9-D12 | ES313622 | 7-45 | HPH1005A010A | 2-22 | SK332770A | 13-54 |
| BMM1101A010A | 3-1x | ED318988 | 7-35 | ES319448 | 9-SW5 | HRH1101A010A | 2-21 | SK332770B | 13-55x |
| BMM1202A010A | 4-12 | ED326168 | 8-D9 | ES319464 | 9-SW3,4 | HZ301777 | 2-8 | SK332773A | 13-52 |
| BRT1005A110B | 4-1x | ED326168 | 8-D50 | ES324007 | 7-33 | HZ308681 | 2-9 | SK332773B | 13-53x |
| BT308918 | 6-8 | ED330319 | 8-D1 | ES330372 | 9-SW2 | HZ308685 | 2-13 | SK332775A | 13-62 |
| BT308919 | 6-9x | ED330319 | 8-D3 | ES573478 | 7-12 | HZ308709 | 5-26 | SK332775B | 13-63x |
| BT308920 | 6-11x | ED331197 | 10-D9 | ET200399 | 9-TR6 | HZ308710 | 5-24 | SK597633 | 3-6 |
| BT308921 | 6-10x | ED332336 | 9-D16 | ET200505 | 8-TR2 | HZ528581 | 2-4 | SP304928A | 13-30 |
| BZM1101A040A | 3-2 | ED510772 | 8-D6 | ET200505 | 8-TR4to8 | MB308701 | 7-67 | SP304928B | 13-31x |
| BZT1008A190A | 5-1x | ED539976 | 8-D5 | ET200505 | 8-TR11 | MB308714 | 5-35 | SP304933A | 13-27x |
| BZT1008A190B | 5-2x | ED560913 | 8-D39,40 | ET200505 | 8-TR14,15 | MB428343 | 7-14 | SP304933B | 13-28x |
| BZT1008A220A | 5-3x | ED560913 | 10-D1to8 | ET200505 | 8-TR23 | MB428343 | 7-50 | SP305022 | 13-36x |
| BZT1008A220B | 5-4x | EF300584 | 6-41x | ET200505 | 8-TR26to33 | MB606712 | 7-48 | SP308805 | 13-34 |
| BZT1009A080A | 7-59 | EF300584 | 6-43x | ET200505 | 10-TR15,16 | MB606712 | 12-2 | SP315587 | 13-35x |
| EC201390 | 8-C10to124 | EF300591 | 6-42x | ET307349 | 8-TR3 | MC305642 | 7-29 | SP331078F | 13-66x |
| EC301912 | 8-C48 | EF300591 | 6-44 | ET308937 | 8-TR16to19 | MC305652 | 7-30x | SP331078G | 13-67x |
| EC304708 | 8-C35to37 | EF300592 | 6-40x | ET308937 | 8-TR22 | MH578957 | 2-5 | SP331078H | 13-68x |
| EC308940 | 8-C44,45 | EF308923 | 6-38x | ET308937 | 8-TR24,25 | MI308707 | 5-20 | SP331078J | 13-69x |
| EC308950 | 8-C46,47 | EF310455 | 6-27x | ET308947 | 6-5 | MI315558 | 5-21x | SP331078K | 13-70x |
| EC310366 | 8-C52 | EF562691 | 6-26 | ET308954 | 9-TR2 | MLB330939 | 7-63 | SP331078L | 13-71x |
| EC310374 | 8-C53 | EF563681 | 6-30 | ET308954 | 9-TR10 | ML308677 | 7-38 | SZ308717 | 5-9 |
| EC310440 | 9-C24 | EF563681 | 6-35x | ET308954 | 11-TR1 | ML308737 | 7-37 | SZ631945 | 6-24 |
| EC312012 | 11-C1 | EF563703 | 6-32x | ET308954 | 11-TR3 | ML328683 | 13-26 | TC331106A | 13-40 |
| EC313534 | 8-C39,40 | EF575932 | 6-29 | ET312497 | 8-TR1 | MPB424023 | 7-60 | VT422673 | 7-64x |
| EC314688 | 6-3x | EF575932 | 6-31 | ET316171 | 10-TR4 | MR308713 | 5-34 | ZG301340 | 7-57 |
| EC314990 | 9-C29,30 | EF575932 | 6-34x | ET316171 | 10-TR7to11 | MR308715 | 5-38 | ZG308722 | 5-15 |
| EC314995 | 9-C55 | EF575932 | 6-36x | ET316171 | 10-TR14 | MS308695 | 7-53 | ZG308728 | 7-18 |
| EC314995 | 11-C3 | EF616555 | 6-28 | ET317919 | 10-TR17 | MS315376 | 5-7 | ZG308734 | 7-28 |
| EC316065 | 6-14 | EF616555 | 6-33x | ET318237 | 9-TR18 | MS342000 | 4-3 | ZG312399 | 5-29 |
| EC316194 | 8-C130,131 | EF659698 | 6-37x | ET318237 | 9-TR24 | MS527591 | 7-19 | ZG313004 | 12-5 |
| EC317918 | 11-C6 | EF683313 | 6-39x | ET328440 | 9-TR3 | MTT1003A340A | 4-10 | ZG313078 | 7-56 |
| EC320548 | 6-2 | EI213390 | 9-IC1 | ET328440 | 9-TR8,9 | MT314987 | 7-1 | ZG317114 | 7-65 |
| EC321088 | 8-C132 | EI304165 | 8-IC2,3 | ET328440 | 9-TR17 | MT534666 | 4-2 | ZG317496 | 4-11 |
| EC321297 | 8-C49 | EI304166 | 8-IC5 | ET391768 | 9-TR13 | MT534677 | 4-5 | ZG331069 | 12-3 |
| EC325380 | 9-C20 | EI305238 | 8-IC4 | ET399846 | 8-TR21 | MT534688 | 4-7 | ZG466312 | 2-7 |
| EC327382 | 6-4x | EI308936 | 8-IC1 | ET517263 | 9-TR7 | MV368886 | 3-3 | ZG540584 | 2-12 |
| EC474671 | 11-C4 | EJ249467 | 6-16 | ET517263 | 9-TR15 | MZ315373 | 5-11 | ZG540617 | 4-4 |
| ED200468 | 8-D7,8 | EJ262732 | 6-15 | ET517263 | 9-TR25 | MZ315374 | 5-6 | ZG567685 | 5-19 |
| ED200468 | 8-D16 | EJ308985 | 9-J1 | ET522268 | 8-TR20 | MZ315375 | 5-5 | ZG576314 | 7-39 |
| ED200468 | 8-D19to22 | EJ308986 | 9-J1 | ET554657 | 8-TR9,10 | MZ397181 | 7-6 | ZG580522 | 7-9 |
| ED200468 | 8-D26,27 | EJ321328 | 9-J2 | ET554657 | 8-TR12 | MZ535072 | 5-25 | ZS201778 | 2-28 |
| ED200468 | 8-D29to32 | EJ324276 | 6-1 | ET554657 | 10-TR12,13 | MZ585900 | 3-7 | ZS302720 | 7-40 |
| ED200468 | 8-D41 | EJ330545 | 9-J3 | ET603257 | 9-TR1 | MZ597690 | 3-8 | ZS306435 | 13-39x |
| ED200468 | 8-D43 | EJ331184 | 9-J2 | ET603257 | 9-TR11 | SAB301411 | 13-32 | ZS318423 | 13-37 |
| ED200468 | 8-D47,48 | EJ692908 | 6-25x | ET603257 | 11-TR2 | SA312529 | 13-24x | ZS319473 | 5-14 |
| ED200468 | 8-D53 | EM330374 | 12-9 | ET639437 | 9-TR4,5 | SBB314002 | 13-8x | ZS323728 | 7-11x |
| ED200468 | 8-D57 | EM330600 | 12-10x | ET639437 | 9-TR14 | SBB314003 | 13-16x | ZS325495 | 12-4 |
| ED200468 | 8-D60 | EO315758 | 9-FL1 | ET639437 | 9-TR16 | SBB314004 | 13-10x | ZS331181 | 13-29x |
| ED224550 | 8-D51,52 | EO319447 | 9-FL2 | ET639437 | 9-TR19,20 | SBB314005 | 13-12x | ZS331566 | 12-8 |
| ED224550 | 8-D54 | EO319447 | 11-FL1 | ET639437 | 9-TR26 | SBB314006 | 13-14x | ZS331568 | 13-72x |
| ED224550 | 8-D56 | EO319495 | 9-VL1 | ET639437 | 11-TR4,5 | SBB601311 | 13-7 | ZS413201 | 2-3 |
| ED249377 | 7-44 | EO330990 | 9-L1,2 | ET666404 | 10-TR3 | SBB601313 | 13-9 | ZS413201 | 3-4 |
| ED283138 | 7-42 | EO331190 | 9-T1 | ET666404 | 10-TR5,6 | SBB601314 | 13-11 | ZS413234 | 13-33x |
| ED301911 | 8-D15 | EP300132 | 8-RL1to4 | ET666415 | 10-TR1,2 | SBB601315 | 13-13 | ZS417216 | 5-10 |
| ED301911 | 8-D18 | EP308949 | 8-RL5 | EV302718 | 8-VR1 | SBB601316 | 13-15 | ZS417216 | 5-13 |
| ED301911 | 8-D24 | EP308973 | 9-RL1,2 | EV308917 | 7-31 | SB315828 | 13-46 | ZS417216 | 7-2 |
| ED301911 | 8-D35 | EP315918 | 7-3 | EV309071 | 8-VR2 | SB315829 | 13-47x | ZS417407 | 2-15 |
| ED301911 | 9-D1to3 | EP315918 | 12-1 | EV315541 | 9-VR5,6 | SC332767A | 13-44 | ZS419670 | 4-8 |
| ED301911 | 9-D6 | EP316121 | 7-23 | EV315542 | 9-VR4 | SC332767B | 13-45x | ZS419670 | 5-8 |
| ED301911 | 9-D9 | EP330351 | 10-RL1 | EV315753 | 9-VR1to3 | SE305035A | 13-19 | ZS419670 | 7-13 |
| ED301911 | 9-D14,15 | EP330363 | 7-25 | EV316442 | 9-VR8 | SE305035B | 13-20x | ZS419670 | 7-49 |
| ED301911 | 9-D18to21 | ER308898 | 9-FR1 | EV319316 | 9-VR7 | SE315562 | 13-5 | ZS421806 | 6-6 |
| ED302091 | 8-D13 | ER308955 | 8-R112 | EV322417 | 9-VR9 | SE315577 | 13-22x | ZS422076 | 2-29 |

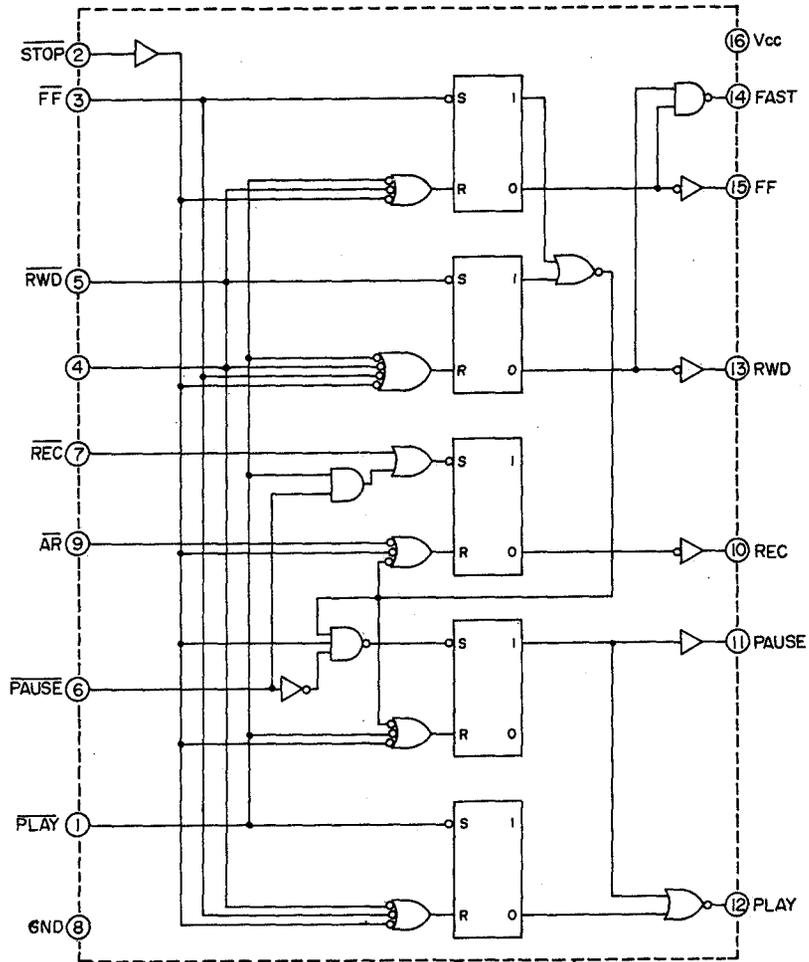
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| ZS422965 | 5-23 | | | | | | | | |
| ZS424056 | 4-9 | | | | | | | | |
| ZS435273 | 6-12 | | | | | | | | |
| ZS444262 | 7-22 | | | | | | | | |
| ZS463353 | 6-17 | | | | | | | | |
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| ZS524812 | 2-23 | | | | | | | | |
| ZS527681 | 7-62 | | | | | | | | |
| ZS572242 | 5-28x | | | | | | | | |
| ZS592378 | 7-26 | | | | | | | | |
| ZS608095 | 2-25 | | | | | | | | |
| ZS608321 | 5-18 | | | | | | | | |
| ZS608477 | 2-26 | | | | | | | | |
| ZS608501 | 2-14 | | | | | | | | |
| ZS613901 | 13-38 | | | | | | | | |
| ZW260043 | 7-16 | | | | | | | | |
| ZW265522 | 2-6 | | | | | | | | |
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| ZW270101 | 5-17 | | | | | | | | |
| ZW270123 | 7-17 | | | | | | | | |
| ZW270156 | 7-58 | | | | | | | | |
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| ZW273914 | 2-2 | | | | | | | | |
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| ZW274026 | 7-20 | | | | | | | | |
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| ZW290283 | 7-8 | | | | | | | | |
| ZW307294 | 5-33 | | | | | | | | |
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| ZW308930 | 5-16 | | | | | | | | |
| ZW309055 | 2-27 | | | | | | | | |
| ZW313593 | 7-27 | | | | | | | | |
| ZW313872 | 5-31 | | | | | | | | |
| ZW313873 | 5-30 | | | | | | | | |
| ZW318099 | 5-12 | | | | | | | | |
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| ZW376391 | 7-61 | | | | | | | | |
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| ZW413267 | 6-13 | | | | | | | | |
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| ZW420682 | 7-7 | | | | | | | | |
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| ZW575730 | 13-23x | | | | | | | | |
| ZW580173 | 7-66 | | | | | | | | |
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| ZW605698 | 3-11 | | | | | | | | |
| ZW616004 | 7-10x | | | | | | | | |
| ZW625241 | 12-7 | | | | | | | | |

SECTION 3

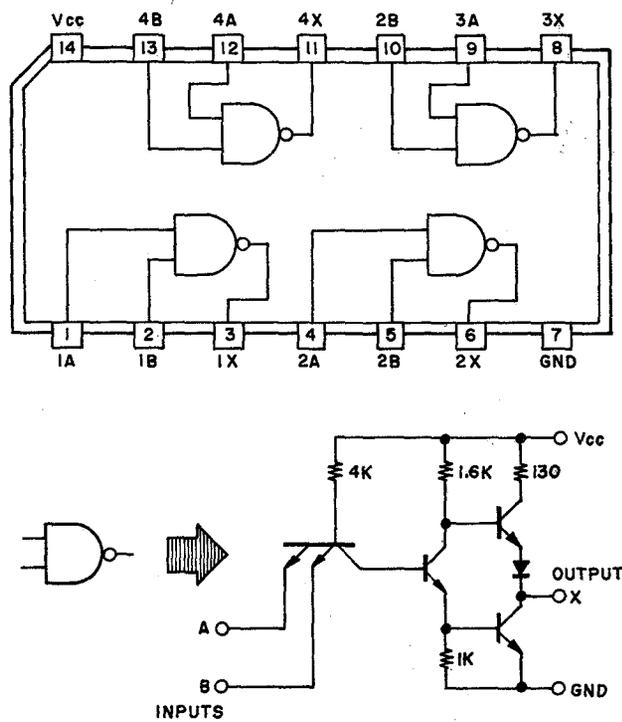
SCHEMATIC DIAGRAM

1. SCHEMATIC DIAGRAM OF ICs
2. GX-646 No. 2-1 1622442A POWER & SYSCON SCHEMATIC DIAGRAM
3. GX-646 No. 2-2 1622443A AMP SCHEMATIC DIAGRAM

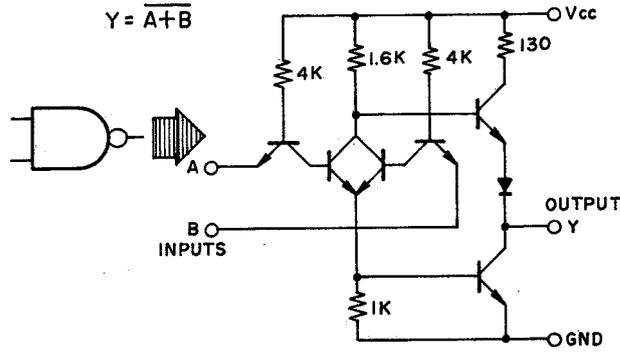
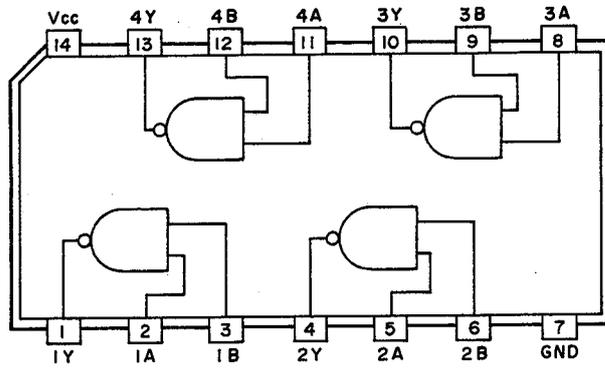
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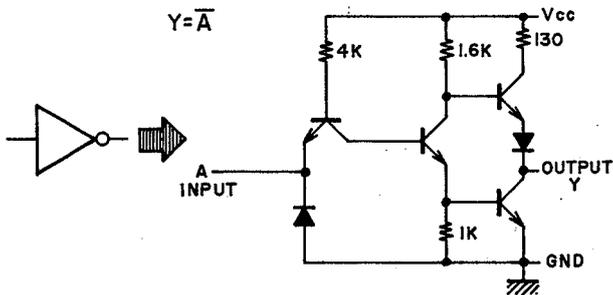
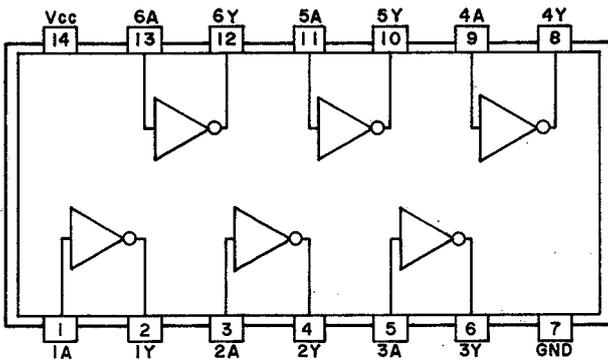
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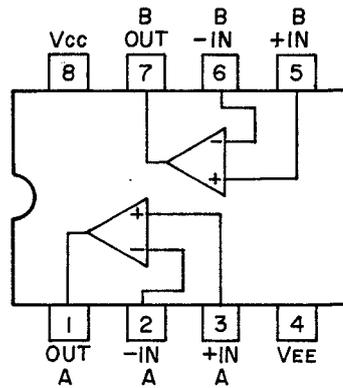
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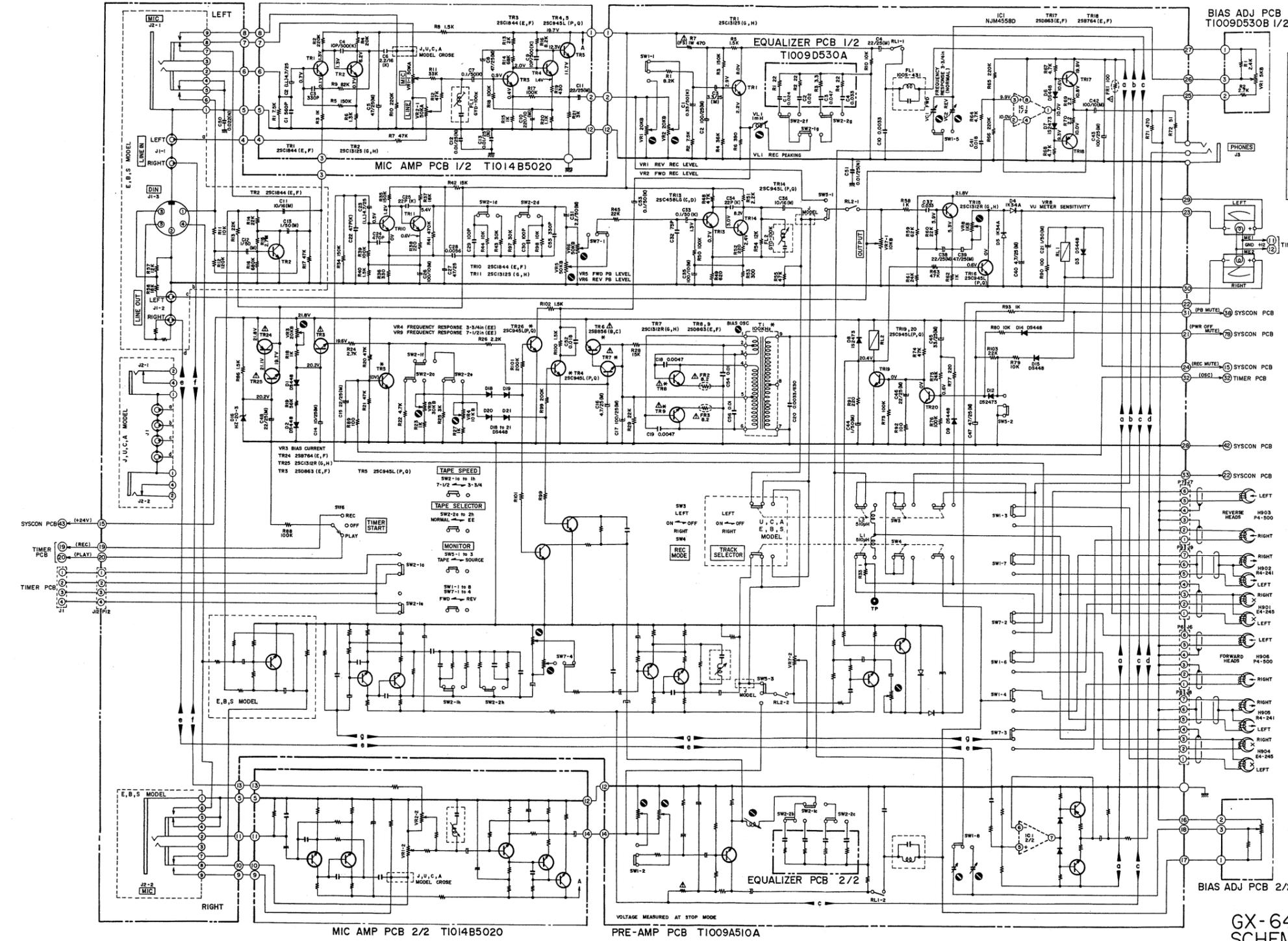
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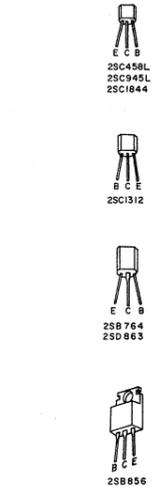
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GX-646



| | | REC MODE | | | |
|-------|---|----------|---------|---------|---------|
| | | 3-3/4in | | 7-1/2in | |
| | | NORMAL | EE | NORMAL | EE |
| TR4 | B | 0.2V | 0.6V | 0.2V | 0.2V |
| | C | 0V | 0V | 0V | 0V |
| TR5 | C | 10.3V | 12.7V | 12.5V | 16.7V |
| | B | 9.7V | 12.2V | 11.9V | 16.2V |
| TR7 | B | 10.3V | 12.7V | 12.5V | 16.7V |
| | C | 21.2V | 31.3V | 21.2V | 21.2V |
| TR8,9 | E | 0.3V | 0.3V | 0.3V | 0.4V |
| | B | 0.2V | 0.2V | 0.3V | 0.6V |
| TR8 | C | 0V | 0V | 0V | 0V |
| TR8 | B | 0.2V | 0.6V | 0.6V | 0.6V |
| LS | B | 9.7V | 12.1V | 11.9V | 16.1V |
| | C | 18.0V | AC18.4V | AC18.1V | AC12.7V |



NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN OHMS (1/4W/1J)
ALL CAPACITORS IN pF (50 WV/1J)
(FS) = FAIL SAFE RESISTORS
(LL) = LOW LEAKAGE CAPACITORS

GX-646 AMP SCHEMATIC DIAGRAM

9. PRE AMP P.C BOARD BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|-------------|--------------|--|
| 9-1 | BAT1014A350A | PC PRE AMP BLK GX-646 (U) (U,C,A) |
| 9-2 | BAT1014A350B | PC PRE AMP BLK GX-646 (J) |
| 9-3 | BAT1014A350C | PC PRE AMP BLK GX-646 (E) (E,B,S,V) |
| 9-IC1 | EI213390 | IC NJM4558D |
| 9-TR1 | ET603257 | TR 2SC1312S G,H |
| 9-TR2 | ET308954 | TR 2SC1844 E,F |
| 9-TR3 | ET328440 | TR 2SD863-V8 E,F |
| 9-TR4,5 | ET639437 | TR 2SC945L Q,P |
| 9-TR6 | ET200399 | TR 2SB856 B,C |
| 9-TR7 | ET517263 | TR 2SC1312R G,H |
| 9-TR8,9 | ET328440 | TR 2SD863-V8 E,F |
| 9-TR10 | ET308954 | TR 2SC1844 E,F |
| 9-TR11 | ET603257 | TR 2SC1312S G,H |
| 9-TR13 | ET391768 | TR 2SC458LG C,D |
| 9-TR14 | ET639437 | TR 2SC945L Q,P |
| 9-TR15 | ET517263 | TR 2SC1312R G,H |
| 9-TR16 | ET639437 | TR 2SC945L Q,P |
| 9-TR17 | ET328440 | TR 2SD863-V8 E,F |
| 9-TR18 | ET318237 | TR 2SB764 E,F |
| 9-TR19,20 | ET639437 | TR 2SC945L Q,P |
| 9-TR24 | ET318237 | TR 2SB764 E,F |
| 9-TR25 | ET517263 | TR 2SC1312R G,H |
| 9-TR26 | ET639437 | TR 2SC945L Q,P |
| 9-D1to3 | ED301911 | D SILICON H DS448 |
| 9-D4,5 | ED308953 | D GERMA H 1K34A-LH SNP |
| 9-D6 | ED301911 | D SILICON H DS448 |
| 9-D7,8 | ED316143 | D SILICON H 1S2473HS F10 |
| 9-D9 | ED301911 | D SILICON H DS448 |
| 9-D12 | ED316143 | D SILICON H 1S2473HS F10 |
| 9-D14,15 | ED301911 | D SILICON H DS448 |
| 9-D16 | ED332336 | D ZENER H HZ20 3 |
| 9-D18 to 21 | ED301911 | D SILICON H DS448 |
| 9-J1 | EJ308986 | PIN J 1784P1782 P 4P (U,C,A,J) |
| 9-J1 | EJ308985 | JACK PLATE DIN, PIN JACK 4P (E,B,S,V) |
| 9-J2 | EJ331184 | PHONE J HLJ0345-100 2x2P (U,C,A,J) |
| 9-J2 | EJ321328 | PHONE J HLJ0345-010 2x3P (E,B,S,V) |
| 9-J3 | EJ330545 | PHONE J 3P HLJ0315-020 6.3 |
| 9-SW1 | ES301435 | SW SLIDE CL210E 2-10-02S |
| 9-SW2 | ES330372 | SW PUSH SUE24 2-THROW |
| 9-SW3,4 | ES319464 | SW LEVER 00420460 2-04-02S |
| 9-SW5 | ES319448 | SW LEVER 00420461 2-04-02N |
| 9-SW6 | ES306714 | SW ROTARY SRU1023N 1-02-03N |
| 9-SW7 | ES301436 | SW SLIDE CL206E 2-06-02S |
| 9-VR1to3 | EV315753 | R S-FIX H D8 3P 203 |
| 9-VR4 | EV315542 | R S-FIX H D8 3P 103 |
| 9-VR5,6 | EV315541 | R S-FIX H D8 3P 503 |
| 9-VR7 | EV319316 | VR ROTARY 16P20x2A B103 |
| 9-VR8 | EV316442 | R S-FIX H D8 3P 102 |
| 9-VR9 | EV322417 | R S-FIX H D8 3P 303 |
| 9-VL1 | EO319495 | COIL VARI1 GYD-102 1MHz |
| 9-RL1,2 | EP308973 | RELAY LEAD LAB2NS 2NO 24V |
| 9-FL1 | EO315758 | COIL TUN 1 100S-431 100kHz |
| 9-FL2 | EO319447 | COIL TUN 1 GYD-100K 100kHz |
| 9-T1 | EO331190 | COIL OSC 1 2330-065 100kHz |
| 9-L1,2 | EO330990 | COIL FIX 2 0358-042 510μH |
| 9-VC1,2 | EO330991 | C S-FIX H ECR-BC090M11 8.0-90 |
| 9-R7 | ER331562 | △ R OMF H SNP FS 1W 471J |
| 9-FR1 | ER308898 | △ R FUSE FR25SJ 1/4W 101J |
| 9-FR2,3 | ER331188 | △ R FUSE ERD2FC F10 1/4W 8R2J |
| 9-C20 | EC325380 | C PP V F10 PFH 332J 630DC |
| 9-C24 | EC310440 | C STY V F05 CQF09 471J 50DC |
| 9-C29,30 | EC314990 | C STY V SNP CQFS 101J 50DC |
| 9-C55 | EC314995 | C STY V SNP CQFS 331J 50DC |

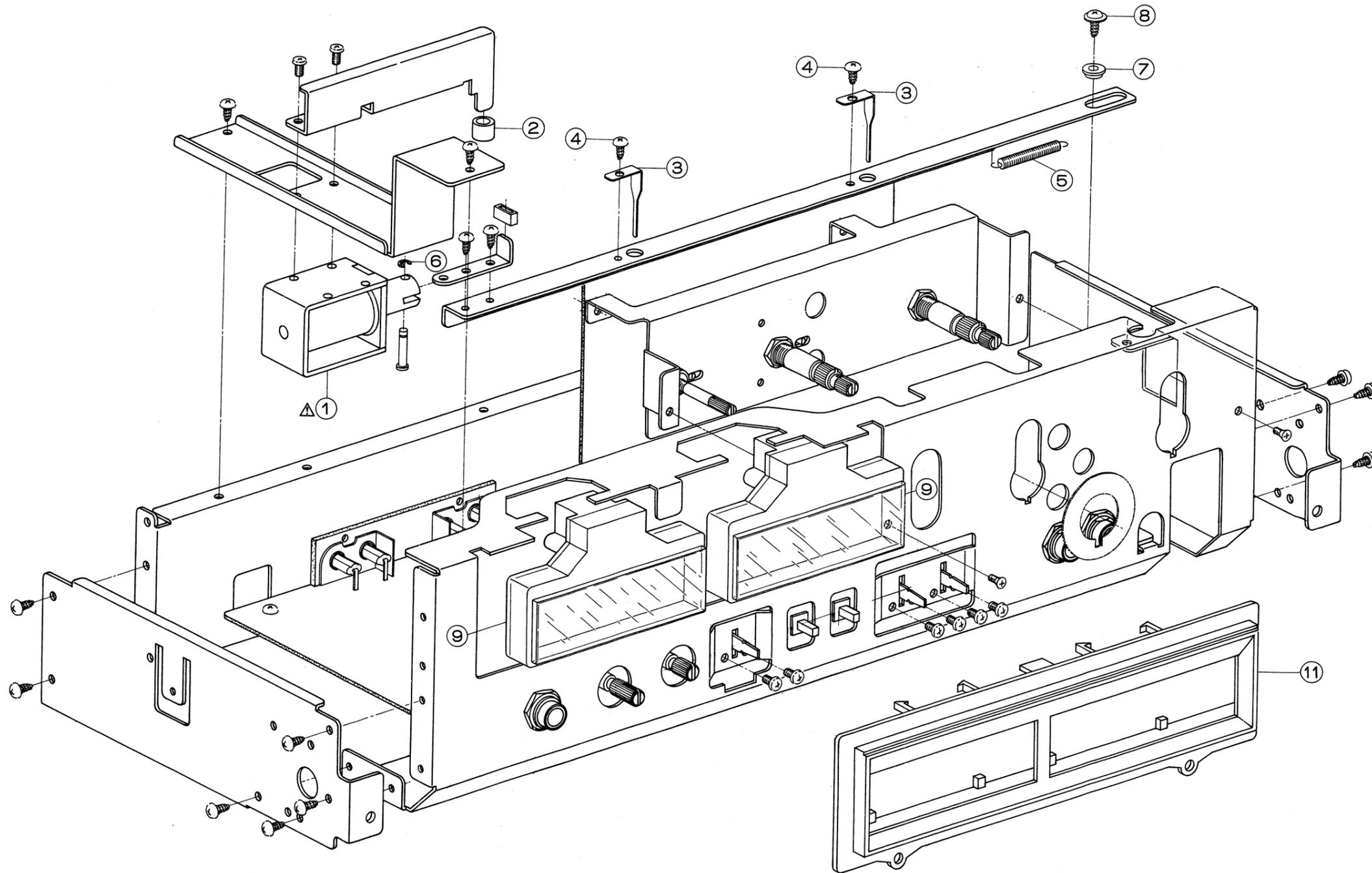
10. TIMER P.C BOARD BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|------------|--------------|---------------------------|
| 10-1 | BAT1014A300A | PC TIMER BLK GX-646 |
| 10-TR1,2 | ET666415 | TR 2SB605 K,L |
| 10-TR3 | ET666404 | TR 2SD571 K,L |
| 10-TR4 | ET316171 | TR 2SC536K-NP E,F |
| 10-TR5,6 | ET666404 | TR 2SD571 K,L |
| 10-TR7to11 | ET316171 | TR 2SC536K-NP E,F |
| 10-TR12,13 | ET554657 | TR 2SA733A P,Q |
| 10-TR14 | ET316171 | TR 2SC536K-NP E,F |
| 10-TR15,16 | ET200505 | TR 2SC2603 E,F |
| 10-TR17 | ET317919 | △ TR 2SC1061 C,D |
| 10-D1to8 | ED560913 | D SILICON V 1S2473VE |
| 10-D9 | ED331197 | D ZENER H HZ6 C1 |
| 10-D10 | ED310607 | D ZENER H HZ18 2 |
| 10-D11 | ED308952 | D GERMA V 1K34A-LR F07 |
| 10-RL1 | EP330351 | RELAY SIGNAL G2KU 1TR 24V |

11. MIC AMP P.C BOARD BLOCK

| REF. NO. | PARTS NO. | DESCRIPTION |
|----------|--------------|--|
| 11-1 | BAT1014A400A | PC MIC AMP BLK GX-646 (U) (U,J,C,A) |
| 11-2 | BAT1014A400B | PC MIC AMP BLK GX-646 (E) (E,B,S,V) |
| 11-TR1 | ET308954 | TR 2SC1844 E,F |
| 11-TR2 | ET603257 | TR 2SC1312S G,H |
| 11-TR3 | ET308954 | TR 2SC1844 E,F |
| 11-TR4,5 | ET639437 | TR 2SC945L Q,P |
| 11-VR1,2 | EV332364 | VR ROTARY 16P11XOY A503 A503 |
| 11-FL1 | EO319447 | COIL TUN1 GYD-100K 100kHz |
| 11-C1 | EC312012 | C STY V F05 CQF09 561J 50DC |
| 11-C3 | EC314995 | C STY V SNP CQFS 331J 50DC |
| 11-C4 | EC474671 | C MC V FM 100K 500DC |
| 11-C6 | EC317918 | C TT V D 2R2K 16DC |
| 11-VR1 | EV331189 | VR ROTARY 16P20x2B B502 |

ASSEMBLY BLOCK



12. ASSEMBLY BLOCK

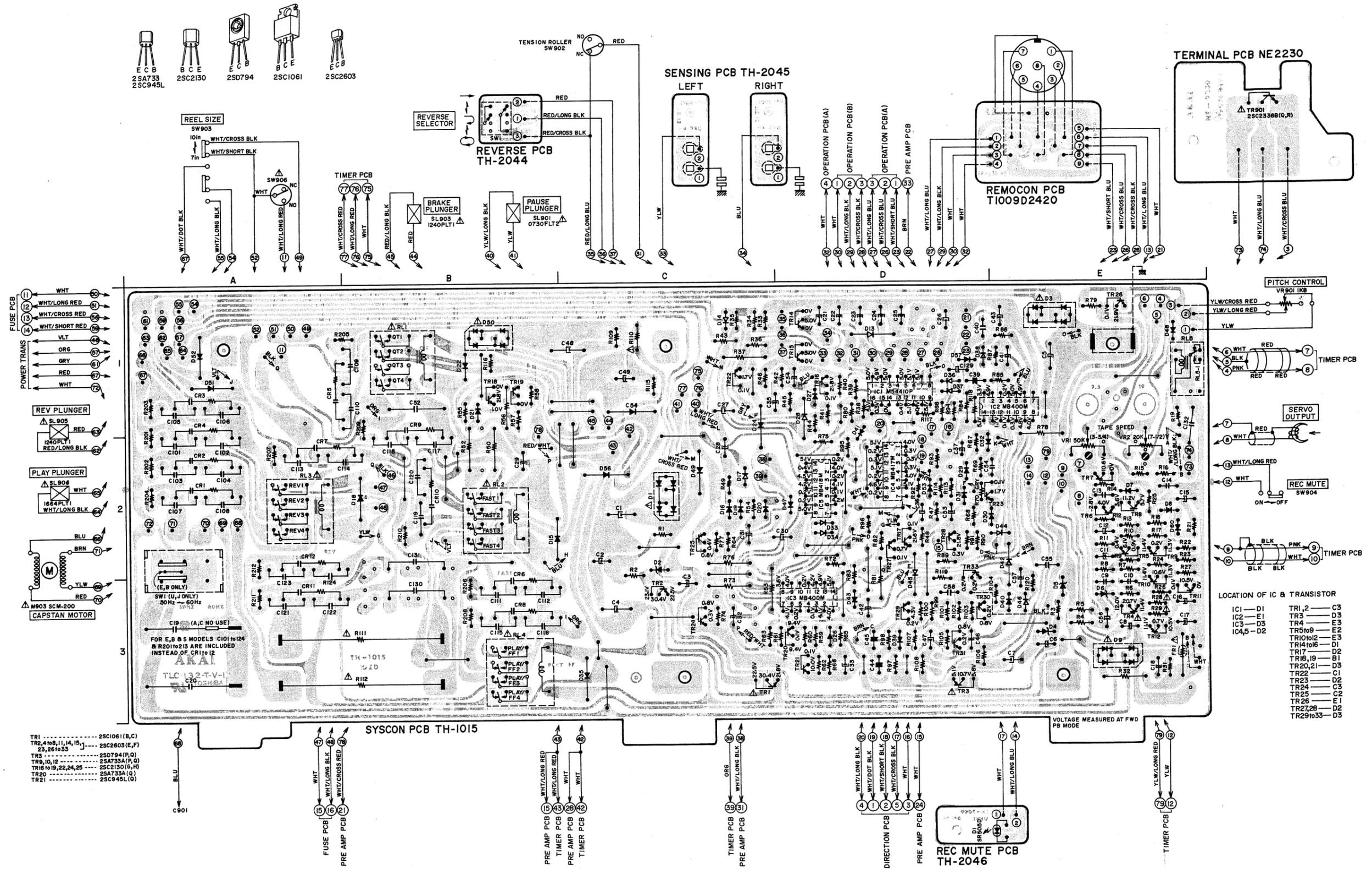
| REF. NO. | PARTS NO. | DESCRIPTION |
|------------------------------|-----------|---------------------------|
| REVERSE PLUNGER BLOCK | | |
| 12-1 | EP315918 | ▲ SOLENOID 1240PLTI |
| 12-2 | MB606712 | KJ STOPPER RUBBER |
| REVERSE ARM BLOCK | | |
| 12-3 | ZG331069 | SP REVERSE |
| 12-4 | ZS325495 | T2BR30x06STL CMT |
| 12-5 | ZG313004 | SP T1-4.0/0.4-35.5 T1-118 |

| REF. NO. | PARTS NO. | DESCRIPTION |
|-----------------------|-----------|--------------------------------|
| ASSEMBLY BLOCK | | |
| 12-6 | ZW270088 | RING E 190SUP CMT |
| 12-7 | ZW625241 | GRADUATED WASHER |
| 12-8 | ZS331566 | PAN30x08STL CMT CUP |
| 12-9 | EM330374 | METER VU D64A24L 0.2 60mA |
| 12-10x | EM330600 | METER VU D64A27L 0.2 60mA (BL) |
| 12-11 | SE332771A | ESCUTCHEON VU |
| 12-12x | SE332771B | ESCUTCHEON VU (BL) |

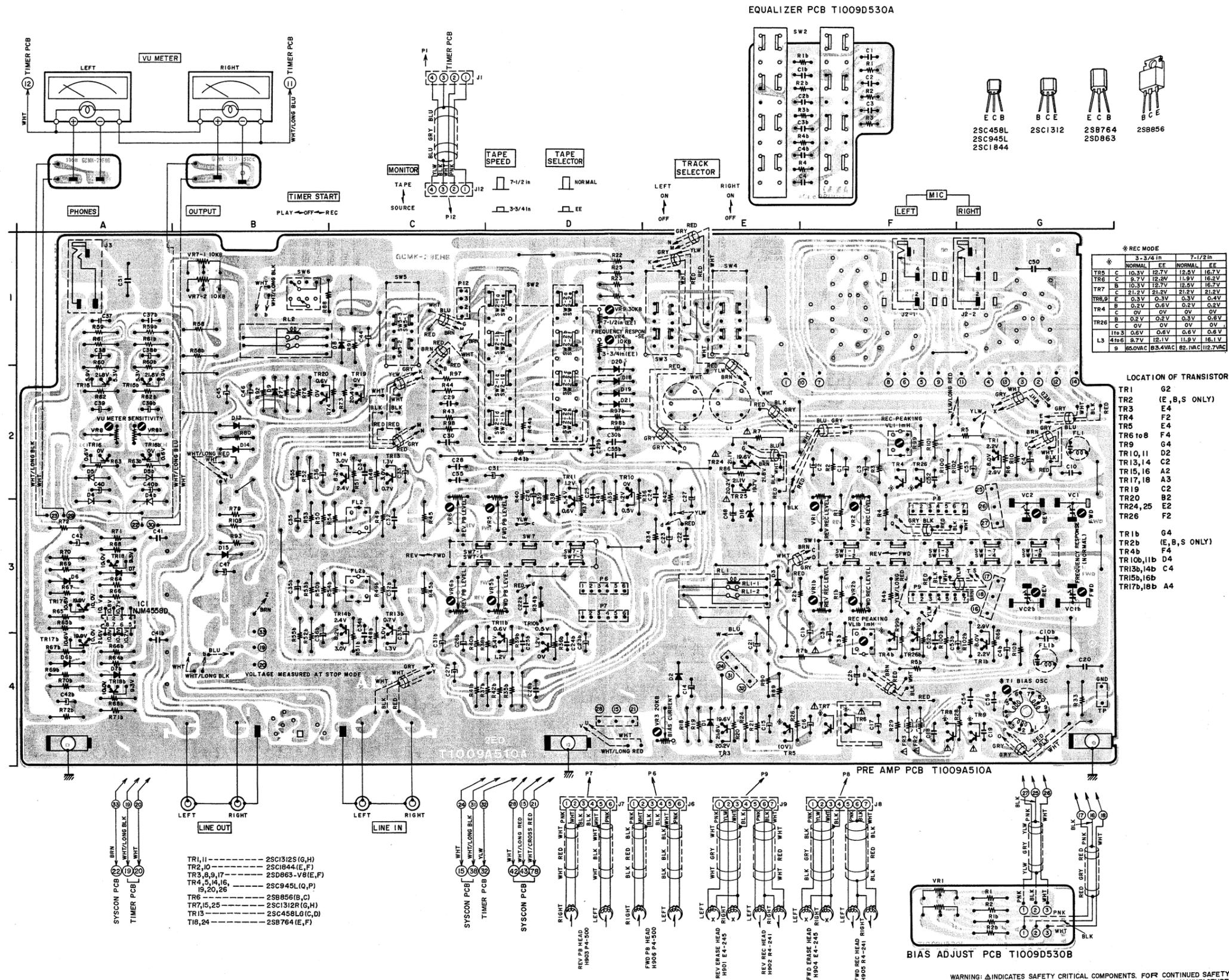
When ordering parts, please quote Parts Number, Description and Model Number.

2. COMPOSITION OF VARIOUS P.C BOARDS

1) Syscon P.C Board TH-1015 (10ED), Reverse P.C Board TH-2044, Sensing P.C Board TH-2045, Rec Mute P.C Board TH-2046, Remocon P.C Board T1009D2420 and Terminal P.C Board NE2230



2) Pre Amp P.C Board T1009A510A (2ED), VU Meter P.C Board T1009A510B, C, Equalizer P.C Board T1009D530A and Bias Adjustment P.C Board T1009D530B



WARNING: Δ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.

AVERTISSEMENT: Δ IL INDIQUE LES COMPOSANTS CRITIQUES DE SÛRETÉ. POUR MAINTENIR LE DEGRÉ DE SÛRETÉ DE L'APPAREIL, NE REMPLACER LES COMPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SÛRETÉ QUE PAR DES PIÈCES RECOMMANDÉES PAR LE FABRICANT.

